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ABSTRACT

The monograph examines the literature of the last decade on the rise and role of the Chief Information Officer (CIO) in higher education, business, and health care and reports results of a 1989 survey of higher education CIOs. After a discussion of the origins of the CIO position and concept, chapter 2 presents a survey of the literature, primarily since 1985. Noted are the large number of perspective pieces, the relatively few surveys of CIOs, and the lack of differentiation between CIO title and function. The findings of the survey of CIOs (N=58) in higher education are reported in terms of the CIO profile; CIO organizations; CIO functions, characteristics, and activities; CIO salaries; trends and issues; and other findings. Notable findings included: self-reported management styles tend to be similar and people-oriented; individuals in the position are relatively happy; CIOs see strategic planning for information technology as part of their role; there was little mention of evaluation activities by CIOs. The fourth chapter presents conclusions comparing survey findings with the literature and offering personal observations. Approximately 150 references are included. The CIO survey questionnaire and results and a profile of the study's corporate sponsor are included. (DB)

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The Association for the Management of Information Technology in Higher Education

# The Chief Information Officer in Higher Education

*by James I. Penrod, Michael G. Dolence, and Judith V. Douglas*

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***Professional Paper Series, #4***

# The Chief Information Officer in Higher Education

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James I. Penrod, Michael G. Dolence, and Judith V. Douglas

**CAUSE**

**The Association for the Management of Information Technology in Higher Education**

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# Foreword

A new senior administrative position first appeared in higher education at the beginning of the last decade. This position was often created at the vice presidential level and vested with policy responsibility for information technology throughout the college or university. Typically this new administrator had line responsibility for the units of academic and administrative computing, and voice and data communications. Not infrequently, other units such as institutional research, printing and reprographics, media services, mail services, TV, planning, and sometimes the library were included in this information resources infrastructure. From a handful of such organizations in 1980, a steady growth has occurred throughout the decade until an estimated 200 positions of this type now greet the 1990s.

Similar developments in business and in health care have mirrored the evolution of what has come to be known as the chief information officer. This paper examines some of the literature that has come about as more and more organizations have initiated this approach to information management. In it, we look at what is said about chief information officers in higher education, business, and health care, and report the results of a survey we conducted in higher education in 1989.

We are grateful to CAUSE for encouraging our study and for publishing and distributing the results. Special recognition goes to Ms. Julia A. Rudy for her diligence, useful suggestions, and great patience during the editing process. The readability of this paper has been significantly enhanced due to her conscientious efforts. Thanks are due to Dr. Larry Jordan, Ms. Ellen Stein, and Mr. Hector Chacon from the Analytical Studies Department at California State University, Los Angeles, for their assistance in questionnaire design and statistical analysis. Ms. Juanita Diaz and Ms. Patricia Espinoza have our great appreciation for their efforts in support of the survey, follow-up, typing, and editing of the draft manuscript. Finally, the study could not have been completed without the help of the survey respondents. The questionnaire was not simple, and time and effort were required to complete it. A very special thank you goes to all of those who did so.

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June 1990

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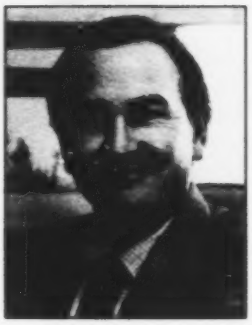

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# 1
# Origins and Overview

*"Leaders are people who do the right thing; managers are people who do things right."*
—Peter Drucker

What is the origin of the chief information officer concept?

A comprehensive computer literature search we conducted found that the first specific reference to the emergence of a new corporate officer—called a chief information officer or CIO—was made by William R. Synnott, speaking at the INFO '80 conference and quoted in a *Computerworld* article (October 20, 1980). The following year, Synnott published an article in *Computerworld* (September 21, 1981), as well as a book with William H. Gruber, *Information Resource Management: Opportunities and Strategies for the 1980s,* which documented both the information resource management (IRM) concept that had begun in the mid-1970s and the need for a high-level corporate officer to provide that management.[1] Thus, the CIO concept grew out of the information resource management paradigm, and the two have since continued to evolve together.

Information management has grown through four distinct stages—from the physical control of data that was characteristic of pre-1950, to automated information systems which emerged in the 1960s, to the IRM concept of the last decade and a half, to the knowledge management paradigm predicted in the 1990s, where the focus will be on the content of information itself and how it is used and valued in the organization.[2]

The IRM stage in this evolution is characterized by converging computing and communications technologies, an explosion in the amount of data available, and a period of increasing investments in information technologies. Information resource management requires high level leadership and must be defined in the context of the organization where it is to be implemented.[3] The IRM approach shifts the organization's information perspectives from an historic operational focus to a new strategic focus, emphasizing how information technology can contribute to the accomplishment of an organization's mission. This change in perspective has caused many chief executive officers (CEOs) to believe that management of information and the technologies that support this endeavor is too important to be left to computer personnel who lack an organization-wide focus. Instead, this new strategic weapon must be designed and wielded by fellow executives who think and talk as they do. Thus the emergence of the chief information officer.[4]

The CIO is defined as a senior executive of the organization responsible for information policy, management, control, and standards. Five primary functions are associated with the position of CIO, including participation in corporate strategic planning, responsibility for information systems planning, leading the development of corporate or institutional information policy, management of the organization's information resources, and development of new information systems capabilities. These functions contrast with more traditional information systems roles which have more of a short-term, project-oriented focus, and an emphasis on day-to-day management responsibility. The most sought-after traits in a CIO are leadership and management skills, a visionary capacity, the ability to marshall technology as a strategic resource, and the ability to bring computing and telecommunications under control. This contrasts with an earlier emphasis on technical expertise.[5]

The CIO function has evolved somewhat differently in business, health care, and higher education. Regardless of the sector, however, the evolution of the CIO function is

[1]William R. Synnott and William H. Gruber, *Information Resource Management: Opportunities and Strategies for the 1980s* (New York: John Wiley and Sons, 1981).

[2]Donald A. Marchand, "Information Management: Strategies and Tools in Transition," *Information Management REVIEW* (Summer 1985): 27-34.

[3]Mel Ray, "Information Resources Management: Four Cornerstones for Implementing IRM," *Information Management REVIEW* (Fall 1986): 9-15.

[4]Allen E. Alter, "The Search for Higher Beings," *CIO Magazine,* May 1988, pp. 21-22, 24-27.

[5]Synnott and Gruber, pp. 66-68.

driven by the need to focus information resources on the primary mission of the organization. In business, the CIO must focus on using information resources to increase shareholder value, compete for profits, provide a return on investment, and so on. In the health care industry, the CIO must focus on providing better health care to patients, providing functionality for clinical practice, and improving administrative systems. In higher education, the CIO must focus on the institution's educational mission (which translates to supporting better teaching, research, and scholarship) as well as improving administrative systems. Within each sector, the CIO function is significantly shaped by the primary mission and culture of the organization.

The extent of the CIO function in business is difficult to determine; however, it has penetrated many of the leading companies in the *Fortune* 1000. In a 1989 analysis of the "biggest and best" users of information technology by *InformationWeek*, 131 (26 percent) of the 500 companies listed had information chiefs who reported directly to the chairman, CEO, or president, with the rest reporting at lower levels. Of those ranked in the top 100, the proportion was higher with 30 percent reporting to the top executive.[6] Not surprisingly, a 1988 *CIO Magazine* analysis of the national top 100 CIOs reported in virtually every case that information technology strategy is a key element of the company's profit plan receiving board-room attention. While there is little consensus in the business literature regarding the use of the CIO title, there appears to be broad acceptance that business needs an information chief to perform CIO functions.[7]

Although technology is transforming the health care industry, the CIO movement here appears to lag behind the broader business community and higher education. It is, however, rapidly emerging as a strategic response to the need for cost containment, improved functionality, improved competitiveness, and new markets. A 1987 survey of 1,100 hospitals revealed 218 senior information systems executives who perform the CIO function.[8]

Today we estimate that there are approximately 200 CIOs in higher education.[9] As in business and health care, technology is transforming education. Challenges facing higher education include competition for students, faculty, grants, and contracts, and operational pressures to increase efficiency, enhance levels of service, meet the demands of regulatory agencies, and provide levels of access to meet rising student and faculty needs and expectations. Not all institutions are affected by these challenges in the same way; thus they respond differently. The emergence of the CIO in higher education (as in business and industry) has come about quickly, but organizational structures and, to some degree, position qualifications continue to evolve and vary from institution to institution. A single, commonly-held perspective does not exist at this time.

The purpose of this paper is to provide an overview of the first ten years of the CIO movement in higher education and, where possible, to contrast higher education with business and health care. In order to provide the history and diversity of sector perspectives regarding the CIO, we conducted a comprehensive survey of the literature, which we report in Chapter 2. Most literature citations on the CIO have occurred since 1985. The review revealed that the most prevalent articles to date regarding the CIO have been perspective pieces. Surveys of CIOs reported in the literature have mostly been proprietary in nature and are included only in summary, with the exception of a higher education survey the results of which are reported in more detail. There has also been little differentiation between the CIO title and function. This distinction is an important one to keep in mind—except where noted, we refer to *function* rather than *title*.

To provide an in-depth look at CIOs in higher education, we conducted a national survey of individuals purported to perform the function of a chief information officer. The purpose of the survey was to establish a baseline for viewing CIOs in higher education—to assess where they come from, where they see themselves going, how they are compensated, what they believe their skills are, their vision of the future, and what is most likely to influence their decisions. The results of our survey are reported in Chapter 3.

In the final chapter of this paper, we explore both findings and questions arising from the survey, and offer for reflection some observations about the literature, our survey, and the CIO movement in higher education.

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[6]Richard Layne, "The Best, the Biggest and the Debate," *InformationWeek*, 18 September 1989, pp. 6-12.

[7]Alter, p. 21.

[8]Heidrick and Struggles, Inc., *Health Care Chief Information Officers* (Chicago, Ill.: Healthcare Information and Management Society of the American Hospital Association, 1988), pp. 1-6.

[9]We initially identified more than 150 individuals who appeared to be serving the CIO function in higher education based on information provided by known CIOs as well as a "title" search of the *1988 Higher Education Directory* and the attendance lists of the 1988 national conferences of CAUSE and EDUCOM (two major national organizations that deal with information technology management and use in higher education). The combined attendance figures for these conferences exceeded 3,500. In culling from the conference attendance lists and the *Higher Education Directory*, we selected individuals with senior administrative titles (including the words vice president and vice chancellor) that also contained words such as information management, information systems, information resources, computing and communications, information technology, and so on. Today, we estimate there are at least 200 individuals with such titles. We believe that small colleges and community colleges were underrepresented on our original list, and such positions continue to be created at a steady rate.

# 2
# The CIO in the Literature

*"It is dangerous to be right in matters on which the established authorities are wrong."*

—Voltaire

To conduct a comprehensive review of the literature surrounding the evolution of the chief information officer, we searched five electronic databases, using both descriptors "chief information officer" and "CIO." Upon printing the bibliography resulting from our searches, we removed duplicates and false hits (such as AFL/CIO) and netted a total of 376 unduplicated citations from the five sources: A search of ABI/INFORM back to 1970 retrieved 240 documents beginning in October 1980, with no citations found from the seventies; COMPUTER DATABASE contained 114 citations between 1983 and 1989; the ERIC database contained four citations between 1985 and 1987; the Health Planning and Administration (HP&A) database contained sixteen citations between 1985 and 1989; and the Microcomputer Index contained three citations from 1987 to 1988.[10]

The pattern of the citations shows a strong and emerging literature based on the CIO. Although the first traceable citation appeared in 1980, the subject has received most of its attention since 1985.

The early literature primarily focused on the developing role of the CIO, characteristics of organizations establishing CIO positions, and CIO surveys. Many of the surveys were conducted by consulting firms and are, therefore, proprietary. The concept has received attention in the general information management literature and in publications specific to the sectors of business, health care, and education. The CIO phenomenon is not restricted to American companies but has also evolved in Canada, Europe, and Japan.

The literature is replete with case studies and assessments of the state of the profession. The CIO concept has its detractors, however, and in many cases they have contributed to confusing rather than clarifying questions and/or issues related to CIOs. One journalist told us that it was his mission to debunk the CIO myth. Another said that the CIO has created quite a stir by threatening both old-line data processing managers and corporate officers such as the chief financial officer. Still another said many get hung up on the title and ignore the function—a function which is here to stay, no matter what we call it. One thing is certain: being called a CIO is not requisite for functioning as a CIO. It is upon the function of the CIO that this paper focuses. We leave the debate as to what the position should be called to others.

The following sections describe the emergence of the CIO function through a review of the literature, including new organizational paradigms, the role of strategic planning, and some skepticism about the CIO position. There is a scarcity of literature dealing specifically with the CIO in higher education, but a look at CIO-related surveys revealed much activity in this area, including one focused entirely on the campus culture.

**Table 1**

**Summary of Unduplicated CIO Citations in the Literature**

| Year | Number of Citations |
|---|---|
| 1989 | 63 |
| 1988 | 135 |
| 1987 | 88 |
| 1986 | 33 |
| 1985 | 33 |
| 1984 | 15 |
| 1983 | 5 |
| 1982 | 2 |
| 1981 | 1 |
| 1980 | 1 |
| Total | 376 |

[10]ABI/INFORM, Computer Database, ERIC, HP&A, and Microcomputer Index were reviewed through early 1990 to capture citations through December 31, 1989.

## The Emerging CIO

The literature reveals that CIOs generally appear in organizations that place a premium on the effective management of information. Two factors are frequently mentioned as reasons for establishing a CIO function. The first is dissatisfaction with current information systems management, productivity, performance, or investments. The second is a vision on the part of the CEO that information is a resource with such strategic significance that its management, planning, and utilization need the highest corporate attention.[11]

Prior to 1980, few organizations made strategic sense of their corporate information or support systems. In many cases, the computing and telecommunications enterprises had a life of their own, cohabitating with the corporate structure but maintaining their own policies, procedures, and culture. That model will not work once information is viewed, developed, and managed as an integral part of an organization's strategic resources. It is the CIO's job to lead the development of information policy that will enable the assimilation of information and supporting technologies into the corporate culture.[12]

The CIO is expected to get control of the information technology enterprise and manage the organization's information resources. The CIO is not expected to be the technical guru or hands-on manager; he/she is a creature of the board room rather than the machine room.[13]

Undoubtedly, this new strategic orientation for information technology and support systems will create new niches, illuminate new challenges, and foster new visions for the information professional. It is the CIO's role to develop new information systems capabilities to serve the niches, meet the challenges, and realize the visions. Thus, the ideal CIO must have an affinity for innovation and entrepreneurship.[14]

The functional evolution of the CIO is driven by a number of issues. Leading these is the need for information policy and programs to be consistent with the organizational mission and/or strategic plan. Filling this need requires a leader at the helm of the information enterprise. Another important issue is the need to get control of the diverse information enterprises, to make sense of investments, and to evaluate progress toward meeting organization goals utilizing information resources.[15]

In the early literature, the CIO was referred to as a "Computer Czar." Later literature points out that CIOs can hardly function as czars, since their power and success depend upon their ability to integrate information systems (IS) with business strategies, create enthusiasm for IS changes, and inspire management peers to appreciate technical developments.

Effective CIOs must be articulate and capable of persuading employees to embrace change; not only do they need to have patience and be good listeners, but they also must be capable of change themselves, regularly revising fundamental assumptions and patterns. CIOs must also have good working relationships with senior executives and key staff. The CIO's power has shifted from one based upon line responsibilities, policies, budget, resource control, the rank of his/her supervisor, and the potent myth that information systems could be understood only by specialists, to a power based upon a knowledge of what technology can offer the organization and a broad perspective on the strategic role that information systems play in the organization. As catalysts for change, successful CIOs derive both power and influence from their demonstrated ability to empower others to create successes.[16]

Perhaps the primary responsibility of a CIO is to align the information technology enterprise with the mission and goals of the institution. In order to do this, the CIO must participate in organizational strategic planning and may be required to perform a number of functions. These functions may include:

- providing leadership on technological issues,
- coordinating/integrating technology initiatives,
- formulating information technology policy,
- strategic planning for information resources,
- making important technology decisions,
- providing solutions to information resource problems,
- relieving management worry about technology, and
- authorizing technology purchases.[17]

Responsibilities and characteristics very similar to these are identified specifically for CIOs in health care. The CIO must

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[11]Marcia Blumenthal, "Letter from the Editor," *CIO Magazine*, September 1988, p. 6.

[12]Madeline Weiss, "Transformers," *CIO Magazine*, September/October 1987, pp. 37-41.

[13]Anne Woodsworth, "Chief Information Officers on Campus," *EDUCOM Bulletin*, Summer 1987, pp. 2-4.

[14]Robert C. Heckman, Jr., "Strategic Planning for Information Technology," *The Bankers Magazine*, September/October 1988, pp. 68-72.

[15]Rosabeth Moss Kanter, *The Strategic and Organizational Impact of Information Technology*, A Background Paper (Nashville: Institute for Information Studies, 1986), pp. 1-8; and G. E. Mangurian, "Tomorrow's CIO Today," *Information Strategy: The Executive's Journal* 4 (Summer 1988): 12-15.

[16]Judith A. Turner, "As Use of Computers Sweeps Campuses, Colleges Vie for Czars to Manage Them," *The Chronicle of Higher Education*, 30 May 1984, pp. 1, 14.

[17]Linda Fleit, "Choosing a Chief Information Officer: Myth of the Computer Czar," *CAUSE/EFFECT*, May 1986, pp. 26-30.

be able to bridge the gap between top management and MIS. He/she must be able to communicate the benefits of information systems to other senior members of the management team. To understand the organization's current business strategies, and be capable of planning future information technologies, are essential. The CIO should have an unbiased, comprehensive view of overall operations and be both innovative and diplomatic in order to communicate and negotiate effectively. A familiarity with statistical methods is needed to ensure that the information provided for decision making is accurate and interpreted correctly. The CIO should be responsible for providing high-quality, cost-effective information management services to each of the major functions within a health care facility.[18]

The CIO, as a leader, must frequently walk a tightrope between the corporate hierarchy demanding strategic advantage and the technocracy. Several issues require the CIO to maintain a delicate balance. One such example is the issue between centralization and decentralization. While the traditionalist views the issue as either/or, the CIO tries to determine within the strategic context of the organization what should be centralized and what should be decentralized. The more strategic approach of the CIO has spawned a third option: "technology-driven control systems that support the flexibility and responsiveness of a decentralized organization as well as the integration and control of a centralized organization."[19]

The CIO's role in organizational strategic planning sets a new context for information systems planning—a focus on meeting organization-wide goals and objectives. This links information systems tactical and operational planning activities, at which traditional computing organizations are frequently very good, with the organization's strategic processes. Within this context, the CIO is expected to "lead" information technology planning. Leading includes determining the systems architecture which meets the organization's needs, constructing an investment strategy consistent with available resources and organizational strategies, developing an implementation strategy for the organization's information infrastructure, and helping align organizational decision processes with system capabilities. The CIO is rarely directly responsible for the implementation of every component of the information infrastructure, due to decentralization, but is responsible to see that the strategic components are put into place.[20]

Another issue faced by CIOs involves justifying technology investments. Traditional approaches often involve garnering a budget to support the information systems unit. In this scenario, the justification might measure the value of investments in new technologies and systems against the number of budgeted positions the systems will replace. Emerging is the CIO who aligns budgetary needs with output needs, convincing the resource holder to contribute the fair unit share to the project. As more board rooms realize the strategic value of information technology resources, the budgetary justification is focusing more on organizational outputs. With such an approach the centralize/decentralize argument is much less important.[21]

This focus on the competitive advantages of strategic information policy, procedures, systems, and resources has far-reaching implications for the organizations, their structures, and decision-making processes. Thus it can be said that, "information technology not only affects how individual activities are performed but, through new information flows, it is also greatly enhancing a company's ability to exploit linkages between activities, both within and outside the company."[22]

*New Organizational Paradigms*

Technology has had and is having profound impacts on communication patterns and organizational structures. The evolution of the CIO signals changes in today's organizations. The hierarchical organization, with a single line of authority headed by a CEO and based on a traditional line and staff structure, is a paradigm of the industrial age. Organizational paradigms of the information age are more and more characterized by flatter organizational structure, with information workers in critical roles and managers who are planners, coordinators, problem mediators, and team organizers. The organization, then, is a network of individuals, systems, and databases, woven together to perform a strategic set of functions.[23]

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[18]Carole J. Bolster, *Guide to Effective Healthcare Information Management and the Role of the Chief Information Officer* (Chicago: Healthcare Information and Management Systems Society of the American Hospital Association, 1988), pp. 1-29.

[19]L. M. Applegate, J. I. Cash, Jr. and D. Q. Mills, "Information Technology and Tomorrow's Manager," *Harvard Business Review*, November/December 1988, pp. 128-136.

[20]Mangurian, p. 13.

[21]Dioga Teixeira, "Productivity Efforts Must Focus on Boosting Systems Output, Not Trimming Input," *Chief Information Officer* 1 (Winter 1989): 5-9.

[22]Michael E. Porter and Victor E. Millar, "How Information Gives You Competitive Advantage," *Harvard Business Review*, July/August 1985, pp. 149-160.

[23]John J. Donovan, "Beyond Chief Information Officer to Network Manager," *Harvard Business Review*, September/October 1988, pp. 134-140; Jack A. Hamilton and David R. Vincent, *What Future for Corporate Executives in the Information Age?*, Supplemental Paper No. 1 (Nashville: Institute for Information Studies, 1986), pp. 1-10; and Jeff S. Luke, "Managing Interconnectedness: The Need for Catalytic Leadership," *Futures Research Quarterly* 2 (Winter 1986): 73-83.

The structure in this emerging networked organization paradigm has fewer organizational levels with a wider span of control; it is horizontally integrated, adopting a flexible operating style designed to respond to a variety of strategic possibilities. The fundamental feature in these new organizational environments is their interconnectedness. The network approach is characterized by flexibility, a blending of organizational units, erosion of organizational barriers, and the outgrowth of strategy as the primary determinant of operating structures. Success is measured in strategic terms requiring an orientation toward achieving institutional goals.[24]

CIOs will continue to face new challenges as information-driven, networked organizations develop. Within this context, the CIO functions as a network manager whose priorities focus on the networks that bind information systems together. This network focus requires involvement in decisions about communications strategies and connectivity at the physical, systems, and applications levels. Linking strategic, tactical, and operational planning is one approach to solving such issues. In a networked CIO organization, the staff function is a supportive rather than an authoritative role and is characterized by "the helping hand model" rather than "big brother mode." Some CIOs, especially in higher education where decentralized organizations abound, have already transitioned to a network management approach; for others, particularly in business, the transition may not be immediate or easy and will in all probability spawn even further change when it does occur.[25]

Technologies alone cannot make an organization successful. Both personal and technological networking must foster a collegial environment and spawn a new culture. The new culture must concentrate on optimizing information as a strategic resource, foster an organization-wide focus on information technology, emphasize meeting strategic goals by applying technology, and shift the function of central information systems staff from doers and helpers to designers and consultants. Acquisition strategies in this IRM-type culture will focus on *why* the organization is buying technology rather than on *what* is being bought. Responsibility for information technology will be shared by *all* organizational managers. The evolution of this organizational culture is illustrated in Table 2.[26]

**Table 2**

**Comparison between Early and Late IRM Culture[26]**

| *Early IRM Culture* | *Late IRM Culture* |
|---|---|
| **Legitimizing Information as a Resource** | **Optimizing Information as a Resource** |
| Focus of Integrating Function within IRM | Focus on Integration of Information Technology Organization-wide |
| **Increases in Functionality by Melding Technologies** | **Focus on Meeting Organization Strategic Goals by Applying Use of Technology** |
| IRM Employees as Doers and Helpers | IRM Employees as Designers and Consultants |
| **Focus on What You are Buying** | **Focus on Why You are Buying** |
| IRM Organization Responsible for Information Technology | All Organization Managers Share Responsibility for Information Technology |

*Strategic Planning Is Key*

There is a symbiotic relationship between networked organizations and a CIO's major functions. Probably the most important function—because it sets the CIO off from many other data processing (DP) and management information systems (MIS) roles—is to participate in corporate strategic planning. Many organizations report that the CIO is a key player in the formulation of strategic goals. The CIO translates information systems into strategic opportunities and, therefore, plays a key role as change agent. In that role, he/she is expected to communicate with the non-technical community about the development and use of information technology in strategic terms, not systems jargon. Investment strategies must then be built and justified around organizational priorities, not systems sophistication or even functionality.[27]

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[24]Carole Barone, "Converging Technologies Require Flexible Organizations," *CAUSE/EFFECT*, November 1987, pp. 20-25; Kanter, pp. 7-8; and Hamilton and Vincent, pp. 1-3.

[25]Donovan, pp. 135-136.

[26]Eugenia E. Brumm, "Chief Information Officers in Service Organizations: A Survey," *Information Management REVIEW* (Winter 1988): 17-30.

[27]James I. Penrod and Michael G. Dolence, "IRM: A Short Lived Concept?" in *Proceedings of the 1987 CAUSE National Conference* (Boulder, Colo.: CAUSE, December 1987), pp. 173-183.

The predominant planning activities conducted in DP and MIS shops are operational and tactical in nature. While this is frequently done with some sophistication, it is most difficult to do it at the strategic level. Strategic planning focuses on issues external to the organization, answers the question of what we should do, deals with the macro issues, spans organizational boundaries, and is characterized by expert participation. MIS or DP planning, on the other hand, has an internal (organizational unit) focus, answers the question how to do it, deals with the impact of the macro issues on individual units, is linked to budget and resource allocation processes, and is characterized by constituent participation.[28]

One of the forces driving the evolution of the CIO is the need for the organization's strategic processes to fully embrace information and supporting technologies. The most important concept, to the CIO, is that strategic processes exist within an organization irrespective of the use or type of planning methodology. What a strategic planning model does is make these strategic processes implicit rather than explicit, link them together in an optimum sequence, and illuminate each unit's role in achieving an organization's strategic goals and objectives.[29]

*Dissenting Voices*

Despite the growth of CIO positions in business, health care, and higher education, many critics have philosophical difficulties with the basic concept of the position or with expectations that are frequently created by having a CIO. Some argue that the forces of decentralization are such that information systems groups will completely disappear. This perspective emphasizes that users are in the best position to judge the importance and priority of applications and to control the interface between computerized and noncomputerized information systems; that when given complete authority, users would also have complete responsibility, and shifting of blame (which often occurs today) could not happen.[30]

Others believe that the CIO position and the idea of strategic information technology are a product of academe and consulting firms. They contend that the rationale for CIOs is hype and fostered by the desire for consulting agreements linked to building strategic (and very expensive) systems. For these critics the CIO is just the latest in a series of titles for the DP manager and a new way to sell senior management on bigger information systems budgets.[31]

Still other writers do not have problems with the idea of a CIO but think that most positions exist in name only. "Others [corporate managers] consider CIOs nothing more than an example of title inflation."[32] A 1987 survey showed that two thirds of the *Fortune* 500 MIS chiefs interviewed considered themselves to be CIOs. However, their reporting relationship, their actions, and their sphere of influence indicated that they were not.[33]

Finally, a February 1990 *Business Week* article created widespread interest by examining the perilous nature of being a CIO, presenting evidence that the position seems to have no power base in most organizations. Included were statistics from a Heidrick & Struggles survey of 300 CIOs that found 98 percent are not on the corporate board, 92.3 percent do not report to the CEO or president, and 60 percent are not on a senior management committee. At the same time, however, the writers point out that "CIO bashing could be costly," and that in the next few years "CIO expertise will be a must." Paradoxically, while its headline seems to herald the demise of the chief information officer, the article concludes on an optimistic note about the future of the CIO, quoting a Heidrick & Struggles executive that in five years "virtually every major company will have a CIO who's a peer to the CEO."[34]

In higher education, the idea of "chief" anything is sometimes looked upon unfavorably. CIOs may be able to suggest guidelines, but not rules. They can consult, suggest, cajole, sit on committees, and take people to lunch, but they had best not order or threaten! Additionally, some of the guiding tenets of a CIO, e.g., integration, may be alien to segments of the university community. Deans of professional schools may not want to share enrollment or development databases with other deans or even central administrators.[35]

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[28]Donald M. Norris and Nick L. Poulton, *A Guide for New Planners* (Ann Arbor, Mich.: The Society for College and University Planning, 1987), pp. 6-9.

[29]James I. Penrod and Judith V. Douglas, "Translating Strategic Planning for Information Resources into Ongoing Management," *Planning for Higher Education* 15 (June 1987): 29-43; and Kanter, pp. 7-8.

[30]John Dearden, "The Withering Away of the IS Organization," *Sloan Management Review* 28 (Summer 1987): 87-91.

[31]David H. Freedman, "Are We Expecting Too Much From Strategic IS?" *Info Systems*, January 1987, pp. 22-24.

[32]John G. Burch, "CIO: Indian or Chief?" *Information Strategy: The Executive's Journal* 5 (Winter 1989): 6.

[33]Robert S. Buday, "In Search of: An MIS Chief Who Truly Functions as a CIO," *InformationWeek*, 25 May 1987, pp. 22-26.

[34]Jeffrey Rothfeder and Lisa Driscoll, "CIO Is Starting to Stand for 'Career Is Over,'" *Business Week*, 26 February 1990, pp. 78-80.

[35]Linda H. Fleit, "The Myth of the Computer Czar—Revisited," in *Organizing and Managing Information Resources on Campus* (McKinney, Texas: Academic Computing Publications, Inc., 1989) p. 194.

### The Campus CIO

CIOs in higher education began to appear by the beginning of the last decade with a strategic focus which somewhat mirrored that in business.

Viewed as an industry, higher education is an information-intensive enterprise. The merging of computing and telecommunications, the information explosion, and the emergence of the microcomputer as an individual productivity enhancer have all facilitated far reaching changes in both the pedagogical and administrative areas of academe. In the purveying of information, the changes touch virtually everyone on campus. The result for many institutions was technology acquisition careening out of control. Maintenance strategies and connectivity issues were developed ad hoc. Chaos and confusion in an area of intense investment led many presidents to seek a new strategic view of information and supporting technologies. So, like industry, higher education possessed all the ingredients necessary for the emergence of a senior executive of the institution responsible for information policy, management control, and standards.[36]

Initially, many higher education institutions set in motion plans that led to the establishment and maintenance of a solid infrastructure of computing technology and services. During this development, there was a good deal of sorting and categorizing of equipment and discussion of the components of the computing and communications infrastructure and its financing; however, there was not much deliberation on equitable deployment strategies and still less focus on making the linkage between information technology and institutional goals.[37]

Very rapidly, the importance of the link between information technology planning and institutional goals became evident, as the role of the CIO in bridging the gap was highlighted. Several factors contribute to the success of CIOs in providing such linkage. These critical success factors include top management support, an organizational strategic planning process, a senior level policy/steering committee, participative decision making, organizational priorities driving information technology decisions, and an evaluation/user feedback system.[38]

It is important to note that not every institution needs a CIO, while others are in desperate need of one, although they may not realize it. The need for a CIO and the definition of that role within the college or university depend upon the way in which the institution views technology (see Table 3). Where the need for a CIO exists and is not recognized, some institutions have assigned additional responsibilities to the computer center director. Such options may prove to be unwise, because the computer center director may well be underqualified, uninterested, already overworked, and, almost certainly, underprepared for the additional tasks.[39]

Higher education institutions have been grouped into three categories based on their perspective regarding information technology:[40]

- Category 1 institutions view information and supporting technologies as a strategic resource, and they view effective information resource management as a necessary condition of excellence. These institutions are where the CIO is most likely to be found. Within this strategic context, the CIO plays a leadership role, explores alternatives, develops strategies to meet institutional needs, and designs an infrastructure to perform strategic functions.

- Category 2 institutions view the management of information and supporting technologies as an aid to performing day-to-day functions. Information technologies are important, without doubt, but merely as enhancers of effectiveness and efficiency. They are not viewed as providing an advantage over competing institutions or viewed as critical to the quality of the student experience.

- Category 3 institutions, perhaps the largest group, are confounded and confused by the role technology and information play in the strategic management of the institution. For this group of institutions, the head of the information unit is expected both to be a technologist and to have executive capability. This information technology manager is expected to solve all technology-related problems, and this is frequently expected without the involvement of other senior administrators in the institution.

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[36]Robert C. Heterick, Jr., *A Single System Image: An Information Systems Strategy*, Professional Paper Series, #1 (Boulder, Colo.: CAUSE, 1988), pp. 1-22. Heterick had earlier suggested the merit of organizing all campus information-related functions into the same reporting structure in "Administrative Support Services," *CAUSE/EFFECT*, November 1981, p. 30.

[37]Carole Barone, "Planning and the Changing Role of the CIO in Higher Education," *Information Management REVIEW* (Summer 1989): 24.

[38]James I. Penrod, "Creating CIO Positions," *Proceedings of the 1985 CAUSE National Conference* (Boulder, Colo.:, CAUSE, December 1985), pp. 40-41.

[39]Linda H. Fleit, "The Myth of the Computer Czar—Revisited," p. 196.

[40]Linda H. Fleit, "Chief Information Officers: New and Continuing Issues—Part 2," *The EDUTECH Report*, July 1988, pp. 4-5.

**Table 3**

## Categories of Institutions by Information Technology Perspective

| | Category 1: Technology as a Strategic Resource | Category 2: Technology as an Aid in Day-to-Day Operations | Category 3: Technology as a Source of Confusion |
|---|---|---|---|
| *Title/Position* | Chief information officer | Computer center director | Senior (information) technology officer |
| *Serves as* | Information strategist and architect | Custodian of machines and data | Technology problem solver |
| *Reports to* | President, chancellor, or provost | Vice president or assistant/ associate vice president | Vice president or vice chancellor |
| *Influence* | Within and beyond the institution | Within the department | Within defined technology areas |
| *Responsibilities* | Leadership, search for new opportunities | Operational efficiency | Coordination, integration of diverse areas |
| *Background and Experience* | Academic management | Programming or other technical work | Up through the technical ranks |
| *Degree* | Ph.D. | Bachelor's | MBA or other master's |

Included with permission from *The EDUTECH Report,* July 1988.

### CIO Surveys

A dozen surveys of CIOs have appeared in the literature over the past four years. The primary focus of these surveys has been to determine the number of CIOs, illuminate the issues, describe organizations where the CIO has been utilized, and shed some light on the impact CIOs have had on their organizations. Comparing the results of surveys is difficult. In most cases, it is very hard to determine exactly who was surveyed. It is clear, however, that no one model is emerging for the CIO and supportive organization. The precise role and expectations of the CIO are as varied and diverse as the companies they are in and the businesses they conduct. The surveys reviewed are summarized in Table 4.

A survey of 400 top IS executives conducted in 1988 by Coopers & Lybrand for *Datamation* showed a profession in transition. The CIO title was held by 15.4 percent; 31.7 percent were vice presidents for information systems, and 35.8 percent directors of MIS. Respondents spent 23 percent of their time working with peers, 21 percent on information technology planning, 16 percent on administration, 13 percent managing operations, and 10 percent on corporate strategic planning. One fifth (20.4 percent) of the respondents reported information technology planning was integrated with business units, 38.8 percent reported that they were reactive to business units, and 34.2 percent reported an interface relationship. Over half of the respondents (52.8 percent) reported that the strategic plan for information technology was developed in the budget process, while 43.9 percent reported they had no formal information technology strategies.[41]

Reports of the 1988 *Datamation*/Coopers & Lybrand survey focused on the use of the title of CIO rather than the functions of one. Data indicated that 59 percent of the respondents felt they operated as a CIO and 27 percent reported to the CEO. Only 7 percent believed they would secure the CEO position. On the average CIOs remained in that position approximately four years.[42]

[41]Ralph E. Carlyle, "CIO: Misfit or Misnomer?" *Datamation,* 1 August 1988, pp. 50-52, 56.

[42]Ibid., p. 51.

Table 4

## CIO Surveys

| Year | Author/Sponsor | Survey Population | Target | Comments |
|---|---|---|---|---|
| 1989<br>1988 | *Datamation*/<br>Coopers & Lybrand | 550<br>400 | Two annual surveys of top IS executives | 15.4% had CIO title |
| 1988 | Passino and Severance/ Arthur Anderson | 120 | *Fortune* 500 service and industrial companies | 40% had CIOs |
| 1988 | Alter<br>*CIO Magazine* | 81 | 100 CIOs of America's largest companies in 33 industries | In-depth interviews with 81 CIOs in America's largest companies |
| 1988 | Brumm | 43 | 50 top-ranked *Fortune* 500 service companies | 57.5% had CIOs, finance reported to the CIO in five companies |
| 1987 | Heidrick and Struggles/ HIMSS | 102 | Hospitals | 34.3% report to CEO, 37.2% report to COO, 16.7% report to CFO |
| 1987 | *Business Week* | 800 | Readers | |
| 1986-7 | Woodsworth | 91 | Members of Association of Research Libraries | Found 32 institutions with CIO position, interviewed 28 incumbents |
| 1986 | Passino and Severance/ Arthur Anderson | 400 | *Fortune* 500 service and industrial companies | See Table 5 |
| 1986 | Arthur D. Little | 300 | Major U.S. corporations | Unclear results; 104 of 140 IS chiefs reported to CEO, 21 had title CIO |
| 1983 | Rymer | 300 | Survey of information executives conducted for Conference Board in New York | 40% were at VP level, 10% at Senior VP level, 25% reported to CEO |
| 1983 | Center for Information Systems Research, Sloan School of Management | 20 | Selected major companies in U.S. and Canada | Conducted to validate earlier research; identified three trends regarding CIOs |

In another CIO survey conducted in 1988, *CIO Magazine* interviewed eighty-one individuals from a selected list of 100 of America's largest companies in thirty-three major industries. The interviews concluded that the only pattern emerging across industries is diversity. Of the eighty-one CIOs interviewed, 14.8 percent reported to the CEO, 30.7 percent to the CFO, and 29.5 percent to a senior VP. This finding that three-fourths of those responding were no more than two levels below the CEO reflected a high-level strategic focus on information technology in these companies. Strategic competitive use of technology was reported by 31.8 percent of the respondents as a major challenge. The answer to whether to centralize or decentralize was both. Over half (forty-two) of the respondents noted that the installed base of personal computers in their company exceeded 2,000 units.[43]

A survey conducted of the top *Fortune* 500 service companies found that twenty-three of forty (57.5 percent) had a CIO whose function focused on the long-range strategic future of the company rather than the short-range, project-oriented, day-to-day functions of traditional MIS directors. The analysis concluded that "titles are not helpful in identifying a CIO."[44]

In health care, a survey was conducted in 1987 by Heidrick and Struggles in cooperation with the Healthcare Information and Management Systems Society (HIMSS) of the American Hospital Association. The results described the typical CIO in hospitals as a 43-year-old white male with an advanced degree earning $71,320. Respondents attributed success to leadership ability (80.4 percent), vision (72.2 percent), knowledge of hospital systems (51.5 percent), business acumen (44.3 percent), decisiveness (16.5 percent), and technical competence (14.4 percent).[45]

[43]Allen E. Alter, "Making a List: The CIO 100," *CIO Magazine*, August 1988, pp. 10-17.

[44]Brumm, p. 21.

[45]Heidrick and Struggles, p. 1.

Probably the most extensive assessment of the corporate sector is provided by Passino and Severance in their report on two surveys of CIOs sponsored by Arthur Anderson & Co. completed in April 1986 and February 1988. The survey population, which included CIOs from companies in the service and industrial segments of the *Fortune* 500, ranked those issues which they felt to be extremely important or very important. Specific responses and the pattern of responses showed some changes in how the two samples viewed the function of the CIO in information management. Table 5 compares the results of the 1986 to the 1988 survey.[46]

In their analysis of the two surveys, Passino and Severance concluded that technical issues were no longer as important, whereas general business issues were increasingly so. This, for them, was evidence that the role of the CIO was "continuing to mature." In addition, the decrease in the number of issues cited (twenty-two in 1986; sixteen in 1988) perhaps suggested a growing consensus on the CIO function within information management.[47]

*Woodsworth's Higher Education Survey*

A 1986-87 survey of CIOs in higher education by Anne Woodsworth examined the role of the CIO in research universities. Of the ninety-one member institutions of the Association of Research Libraries surveyed, thirty-two (35.2 percent) were identified as having established a chief information officer position and ten (11.0 percent) were either considering, or in the process of, establishing the position. In the institutions with a CIO, the titles varied, with eleven (34.4 percent) being vice president, nine (28.1 percent) associate vice president/chancellor, four (12.5 percent) director, three (9.4 percent) associate provost, three (9.4 percent) assistant vice president, and two (6.2 percent) vice provost. The word "information" appeared in over 90 percent (twenty-nine) of the titles, while the descriptors "computing" or "computer" appeared in fourteen (43.8 percent), "information systems" appeared in thirteen (40.6 percent), and "information technology" appeared in seven (21.9 percent). Twenty-nine of the thirty-two institutions with CIO positions had incumbents in the position, four of whom were women (13.8 percent).[48]

Of the twenty-nine incumbents, twenty-eight completed an in-depth telephone interview. Of those, eight (28.6 percent) reported to the president, seven (25.0 percent) to the executive vice president, and ten (35.7 percent) to the provost or academic vice president. The survey also compared the reporting structure of the library director and CIO. Library directors reported at the same level as CIOs in 39.3 percent of the institutions; 14.2 percent of the library directors reported to the CIO; and 39.3 percent reported lower. Committees that advised about or formulated policies and/or

[46]Jacque H. Passino and Dennis G. Severance, "The Changing Role of the Chief Information Officer," *Planning Review* 16 (September/October 1988): 38-42.

[47]Ibid., pp. 39, 41.

[48]Anne Woodsworth, "The Chief Information Officer's Role in American Research Universities" (Ph.D. dissertation, University of Pittsburgh, 1988), pp. 25-29.

**Table 5**

**Comparison of Top Five Issues Identified by Fortune 500 CIOs[46]**

| Rank | % | 1986 Issues | Rank | % | 1988 Issues |
|---|---|---|---|---|---|
| 1 | 76 | Facilitating/managing end user computing | 1 | 92 | Communicating with top management, functional managers, end users |
| 2 | 72 | Translating information technology into competitive advantage | 2 | 76 | Improving productivity of applications system development |
| 3 | 69 | Having top management understand needs and perspective of information systems | 3 | 74 | Translating information technology into competitive advantage |
| 4 | 66 | Measuring and improving IS/DP effectiveness and productivity | 4 | 73 | Developing quick response capability |
| 5 | 63 | Keeping current with changes in technology | 5 | 69 | Managing information resources |

made recommendations about major computing acquisitions existed at eleven (39.3 percent) of the twenty-eight institutions; at four, the CIO served as an *ex-officio* committee member, while at seven the CIO chaired the committees.[49]

Eighteen (64.3 percent) of the positions had been in existence two years or less, six (21.4 percent) for three years, and only four (14.3 percent) had been in place for four years or more. Over half (60.7 percent) of the respondents came to their position from within the same institution. All had advanced degrees, with 82.1 percent reporting doctoral degrees and the rest (17.9 percent) a master's degree. Nearly 36 percent reported computer science, engineering, or physics majors. The rest had majors in areas such as higher education or public administration, business administration, statistics, mathematics, economics, library science, bioanthropology, political science, and sociology.[50]

Formal line responsibilities of the CIOs in the Woodsworth survey included academic computing in twenty-five (89.3 percent) of the institutions participating in the telephone survey, administrative systems in twenty (71.4 percent), telecommunications in twenty-two (78.6 percent), libraries in four (14.3 percent), and media services in four (14.3 percent). In ten institutions, a variety of other units reported to the CIO, suggesting idiosyncrasies or unique historical organizational structures: planning and institutional research, student admissions and financial aid, and personnel services. Although a number of respondents reported distributed and decentralized operations, most had "responsibility for operation of some mainframe or network support" in academic and administrative computing. Telecommunications responsibilities were partial in some cases, with the CIO tending to have data communications rather than voice.[51]

The CIOs ranked activities in which they were directly involved in decision-making in the following order: major hardware/software purchases first, contracts for initial major purchases second, formulation of policies third, and formulating long-range goals fourth.[52]

In summary, although many articles have been written in the past few years that provide some insight into the nature of the CIO position in the corporate, health services, or academic world, most literature in the popular press consists of opinion pieces. Case studies appear elsewhere. Very few articles provide data to support inferences drawn or conclusions reached. As noted, where surveys exist, in most cases only summaries are generally available; comparisons of hard data are impossible.[53]

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[49]Ibid., pp. 25-33.

[50]Ibid., pp. 30-32.

[51]Ibid., pp. 35-36.

[52]Ibid., p. 55.

[53]Brumm, p 17.

# 3
# Findings of Our CIO Survey

*"If everything seems under control, you're just not going fast enough"*
— Mario Andretti

Between March and May of 1989, we conducted a national survey of 151 institutions of higher education, having identified survey recipients by title from attendance lists of the 1988 national conferences of CAUSE and EDUCOM, the *1988 Higher Education Directory*, and referrals from other CIOs (see footnote 9, page 2, for details). Surveys were sent with an individualized cover letter in March, with follow-up phone calls and one follow-up postcard reminder. We found six survey recipients were no longer at the institution and another six indicated that they were not CIOs. Of the remaining 139, fifty-eight (42 percent) responded to the survey.

The surveys were coded, entered into a DBase III Plus file, and uploaded for statistical analysis in SPSS. Open-ended questions were reviewed, coded, and grouped by Analytical Studies staff at California State University, Los Angeles. Frequencies, descriptive statistics, and preliminary cross tabulations were run and analyzed. A final set was produced to complete the analysis.

Although there were fifty-eight respondents overall, not every question was answered by all respondents. Response percents are figured, for most questions, on the overall number of survey respondents, but for others percents reported are based on the number who actually provided a response. The number responding to each question is shown in the Appendix, where both the survey questionnaire and a detailed summary of responses are provided.

Table 6

**Responses by Institution Type**

| | Private | Public | Total |
|---|---|---|---|
| Comprehensive | 07 | 12 | 19 |
| Research | 13 | 17 | 30 |
| Other | 06 | 03 | 09 |
| Total | 26 | 32 | 58 |

**The CIO: A Profile**

The average CIO responding to our survey is a 46-year-old Caucasian male with a title of vice president, who has been in his position for 3.6 years, and annually earns a median salary of $89,167. He works at an institution with a $240-million budget, enrolling 15,000 students. He heads a unit with a $9.6-million yearly budget, employing 135 staff.

Nearly 40 percent of the survey respondents report to the president/chancellor, 19.0 percent to the provost/academic vice president, and 36.2 percent to the executive/other vice president. Fifty-four (93.1 percent) are males and four are females. The group indicated high professional involvement: 72.4 percent stated they have published in the past five years, and those who consult do so on average 9.6 days per year. The doctorate is held by 62.1 percent of the respondents, 51.7 percent have academic rank, and 34.5 percent are tenured. Nearly one in four holds an undergraduate degree in mathematics.

There are a number of pathways to the position of CIO. Both the literature and our survey indicate that the technical route is the least traveled. Only eight (13.8 percent) of the survey respondents reported their background as technical; twenty-eight (48.3 percent) have administrative backgrounds, and twenty-two (37.9 percent) are from academic ranks.

CIOs responding to our survey can be grouped into two basic categories regarding future aspirations: the first includes those for whom the position of CIO is a means to a broader, more strategic role in an organization; and the second, those for whom the position of CIO is an end, the pinnacle of their career. Twelve of the respondents reported aspirations beyond a CIO position (20.7 percent), while the responses of forty-five (77.6 percent) indicated satisfaction with the CIO career, with one not responding to this question.

What do CIOs read? The most-read publication among the fifty-three CIOs responding to this survey question is *The Chronicle of Higher Education*, with twenty-four responses (45.3 percent). *Computerworld* ranked second with nineteen (35.8 percent), and the *Wall Street Journal* third with twelve (22.6 percent). *Datamation* and *CAUSE/EFFECT* tied for fourth with ten each (18.9 percent); followed by *Information WEEK* and *EDUCOM Bulletin* (now *EDUCOM Review*) with eight each (15.1 percent); *Infoworld*, *MIS Week*, *PC Week*, and *Business Week* with six each (11.3 percent); and *CIO Magazine* with five (9.4 percent).

There was a remarkable consensus on the management style employed by CIOs. In fact, management style might be used to define a CIO approach to administration. Characteristic descriptors were consensus building, service orientation, consultation, an emphasis on planning, professionalism, a focus on meeting objectives, and collaboration. The CIO at a private research university described his management style as "people oriented, hire competent people who complement my abilities, let managers manage, reward and punish." A CIO from a small private college reported a management style which was "participatory, working as an advisor who is a supplier of services and resources to complement the academic mission, informative, entrepreneurial, manage by building consensus on strategic solutions." The CIO of a large private research university described his management style as "a contingency approach, decentralized, characterized by delegation and influenced by planning."

Other responses had a wide range: "delegate authority and responsibility together," "informed participatory democracy, based on recommendations of highly qualified staff," "open door, conciliatory, non-argumentative, non-intrusive, direction setting," "delegation to line managers, action-oriented decision making, use of strategic planning, and a strong emphasis on empowering staff."

Some thirty-eight (65.5 percent) of all respondents indicated participation in executive decisions that were not information resources oriented. General administrative matters such as budgeting, human resources, facilities, and planning were most frequently mentioned. Academic affairs and curriculum issues were also prominently listed. Thirty-four individuals (58.6 percent) indicated that they are executive officers of their institution and twenty-eight (48.3 percent) regularly attend board of regents' meetings.

### CIO Organizations

Organizational units headed by responding CIOs appear to be idiosyncratic to the personalities, politics, and histories of individual institutions. No generalizable patterns appear to exist that would readily predict organizational make-up. Very few individuals hold positions with the title chief information officer. The title most frequently held by those who responded to our survey is vice president (nineteen, or 32.8 percent). Indeed, some thirteen (22.4 percent) respondents do not refer to themselves as CIOs although they perform the functions generally attributed to that position.

Table 7

**Strengths by Organization Type**

('Total' Percents Based on Fifty-four Respondents)

| Strengths | Total | IRM | CIO | Other |
|---|---|---|---|---|
| 1. Institutional Commitment | 43/79.6% | 26/81.3% | 12/80.0% | 05/71.4% |
| 2. IRM Organization | 22/40.7% | 17/53.1% | 03/20.0% | 02/28.6% |
| 3. Technical Expertise | 18/33.3% | 09/28.1% | 05/33.3% | 04/57.1% |
| 4. Talented Staff | 13/24.1% | 08/25.0% | 02/13.3% | 03/42.9% |
| 5. Funding | 12/22.2% | 07/21.9% | 04/26.7% | 01/14.3% |
| 6. Planning | 11/20.4% | 07/21.9% | 03/20.0% | 01/14.3% |
| 7. Academic Programs | 09/16.7% | 03/09.4% | 04/26.7% | 02/28.6% |
| 8. Innovation | 05/09.3% | 04/12.5% | 01/06.7% | 0 |
| 9. Vendor Relations | 05/09.3% | 03/09.4% | 02/13.3% | 0 |
| 10. All Other Strengths | 24/44.4% | 13/40.6% | 07/46.7% | 04/57.1% |
| Total (4 did not respond) | 54/100.0% | 32/59.2% | 15/27.8% | 07/13.0% |

Table 8

**Weaknesses by Organization Type**

('Total' Percents Based on Fifty-four Respondents)

| Weaknesses | Total | IRM | CIO | Other |
|---|---|---|---|---|
| 1. Funding | 38/70.4% | 25/75.8% | 08/53.3% | 05/83.3% |
| 2. Lack of Understanding | 29/53.7% | 16/48.5% | 08/53.3% | 05/83.3% |
| 3. Organizational Structure | 20/37.0% | 10/30.3% | 08/53.3% | 02/33.3% |
| 4. Lack Human Resources | 16/29.6% | 14/42.4% | 01/6.7% | 01/16.7% |
| 5. Bureaucracy | 14/25.9% | 08/24.2% | 04/26.7% | 02/33.3% |
| 6. Lack of Planning | 09/16.7% | 03/09.1% | 04/26.7% | 02/33.3% |
| 7. Training | 07/13.0% | 06/18.2% | 0 | 01/16.7% |
| 8. Technical Needs | 07/13.0% | 03/09.1% | 03/20.0% | 01/16.7% |
| 9. Lack of Coordination | 06/11.1% | 02/06.1% | 02/13.3% | 02/33.3% |
| 10. All Other Weaknesses | 13/24.1% | 06/18.2% | 06/40.0% | 01/16.7% |
| Total (4 did not respond) | 54/100.0% | 33/61.1% | 15/27.8% | 06/11.1% |

Institutions surveyed were classified into three general organizational categories. Units made up of academic computing, administrative computing, and telecommunications were labeled "CIO organizations." Units that had these organizational entities plus others were called "IRM organizations." Units where the above stated criteria were not met were signified as "other." The fifty-eight respondents to the survey grouped according to this criteria resulted in seventeen CIO, thirty-three IRM, and eight other units.

Who reports to the CIO? Data communications reported to the CIO in fifty-six (96.6 percent) of the responding institutions, administrative computing in fifty-two (89.7 percent), academic computing in fifty (86.2 percent), voice communications in forty (69.0 percent), planning in nineteen (32.8 percent), television services in sixteen (27.6 percent), institutional research in eleven (19.0 percent), printing in ten (17.2 percent), copying/reprographics in ten (17.2 percent), mail services in ten (17.2 percent), library in nine (15.5 percent), and media services in nine (15.5 percent).

It is of interest to note that CIOs who report to the president are more likely to supervise institutional research and that CIOs who are executive officers of the institution are more likely to oversee voice communications.

The survey asked respondents to list the top four strengths the institution brings to bear upon information resources management. By far the most frequent response was "institutional commitment," mentioned by almost 80 percent of the fifty-four respondents who answered this question. Not surprisingly, "an IRM organization" was more frequently mentioned by respondents in the IRM category.

The CIO of a large comprehensive university described campus strengths as "committed top management support, excellent information infrastructure under development, good staff and committed faculty, good vendor relations resulting in 'sweetheart deals' and donations." The CIO of a large public research university listed strengths as "willingness of faculty and administration to use technology, little interference from administration, identification of effective use of information technology as a campus strategic goal."

The survey asked respondents to list the top four weaknesses their institution must overcome in addressing information resources management. The most frequently reported weakness was the level of funding, followed by a lack of understanding of technology issues. Respondents from CIO units tended to list "organizational structure" as a weakness more frequently than respondents from IRM and other organizational types. The CIO of a large public research university reported as weaknesses the "vacillating state funding patterns and policies, extreme decentralization and fragmentation of decision-making, rigid civil service style personnel system, and a culture of excessive parochialism among units." The weaknesses of a medium-sized private comprehensive university were reported by the CIO as "the library and computing center are fiercely independent, telecommu-

nications run by an outside contractor, this year's budget too dependent on current enrollments."

Other weaknesses cited include "computing is not infused into the curriculum, information technology is not viewed as a success factor for the university," "there is a severe fragmentation of resources, too many turf issues, serious space limitations for new labs," "there is a lack of understanding of the value of strategic investments in information technology," "information technology is easy to cost [but] hard to quantify benefit, a benefit which is poorly understood," and "state formulas and mandates are seriously out of date and do not accommodate modern information needs."

Funding, organizational structure, technical need/expertise, staff, commitment/lack of understanding, and planning are prominent on both lists of strengths and weaknesses. Thus it seems reasonable to conclude that these variables are unusually important in determining the success of organizations headed by a CIO.

The necessity of determining technology needs and strategies in concert with institutional needs and priorities is cited repeatedly in the literature. A perceived misalignment is often cited as a reason for embarking on a CIO approach. Communication with various constituents regarding technology was found to be key to the success of organizations, both in the literature and in our survey. Consensus appears to be an important part of success, and shared governance of technology resources appears to be an element important to consensus. Information technology committees were reported by fifty-four of the fifty-eight respondents. In thirty-three of the fifty-four (61.1 percent), the committee(s) served both operation and policy functions, and in eighteen (33.3 percent) the committee(s) served a policy function only.

Our survey indicates that service orientation is one of the hallmarks of organizations led by a CIO. As one CIO put it, "We are 100 percent service and have no other function." Another stated, "Service distinguishes us from similar institutions," and a third portrayed his organization's academic services as "akin to those of the library."

A CIO at a comprehensive midwestern state university took a strategic stance toward service: "If we can't do it better, faster, cheaper than another alternative, then we shouldn't be doing it at all." Another CIO at a comprehensive state university on the west coast reported this philosophy: "Our IRM unit's existence is justified based on the services we offer; we seek to understand user expectations and perceptions by conducting ongoing evaluations of our service and align the services provided with those needed." The CIO of a small private technical college reported that the "orientation of staff is to consider users both customers and collaborators balanced with support for staff professional growth."

A respondent from a medium-sized, private, comprehensive university reported: "The University Computing Center is charged with helping all units in the use of computing and networking technology. On the academic side this includes a rich hardware and software environment, the management of laboratories, statistical and other consulting, and [a] help hotline. Administrative computing support is more traditional." The CIO at another medium-sized, private institution stated, "We are completely service oriented; no one ever came to our school because of our infrastructure. We serve, we try to facilitate, we try to ease impediments to computer services, and data communications services."

Selected responses from other institutions include:

— "[We] see to it that customers get what they need as well as what they want."

— "Our service is user driven, [we] minimize restrictions, use persuasion to get funds and resources and put them where university priorities dictate."

— "[We] support university mission, provide technical aid to people in their jobs, offer training, and [a] help line."

— "We support the university's principal mission of teaching, research and service."

— "Service helps develop [an] appreciation for IT resources to further [our] mission."

— "High quality service, follow-up, high esprit de corps, high visibility, quick response, problem solving, administrative application teams moving from serving [a] control function to providing user service."

— "We are moving toward [an] information service utility: service level agreements, user funding of service increases, greater outreach operation, education, training, systems development."

**CIO Functions, Characteristics, and Activities**

There was remarkable consistency between the primary functions reported for CIOs in the literature and those performed by our survey respondents. Irrespective of the sector, the CIO is expected to provide leadership for the development and utilization of information technology for the organization, and to develop an investment strategy consistent with organizational goals and resources. The CIO is also expected to evaluate needs and performance and improve both the effectiveness and efficiency of the organization's technology enterprises.

What functions do higher education CIOs perform? The survey asked (open-ended) for each CIO to list the four most important functions of his or her position. Fifty-two individuals responded to the question, identifying leadership (42/80.8 percent), planning (37/71.2 percent), and communica-

tion/liaison (32/61.5 percent) as among the most important functions of their job. Slightly more than one-third (18/34.6 percent) identified both providing vision and managing the IS budget. Twelve (23.1 percent) of the fifty-two listed coordination and only eight (15.4 percent) cited technical expertise as a most important function. Seven individuals (13.5 percent) listed consensus building and four (7.7 percent) identified problem solving.

While the classifications are interesting, the actual responses add significant insight into chief information officers' perceived functions. One CIO from a mid-sized state university articulated as his function "to generate additional resources." Another CIO, when writing of vision, reported his function as "forming and expressing a vision (broad view, as well as specific tasks) and plan," coupled with "setting an agenda for the institution within which information systems must sit." One CIO listed "marketing unit services" as a primary function. The CIO of a major research institution listed "leadership of the operating organization" first, and "providing an interface with faculty, administration, and vendor management" second.

Vendor relations, in fact, were identified as prominent activities by CIOs responding to an open-ended question regarding how they spend their time. Of the fifty-one respondents to this question, thirty (58.8 percent) listed vendor relations among the four things that they spend the most time on. Human resource management received the most mentions with forty-one (80.4 percent); planning and strategizing ranked second with thirty-one responses (60.8 percent); vendor relations tied with meetings for third place, each with 30 (58.8 percent). The remaining responses, in rank order, were: budgeting (21/41.2 percent), keeping current (15/29.4 percent), telephone calls (7/13.7 percent), and crisis management (5/9.8 percent). There appears to be a close alignment between CIOs' perceived functions and the activities on which they actually spend their time.

Eleven of the fifteen respondents in CIO organizations (73.3 percent) and twenty-five of the thirty-three respondents in IRM organizations (75.8 percent) have strategic plans for information resources, while only two of the eight respondents from "other" types of organizations (25 percent) indicated such a plan. Twenty-five of all responding institutions (43.1 percent) have institutional strategic plans, but only eleven of these (44.0 percent) use a formal strategic planning model.

There appears to be a relationship between IRM-type organizations and strategic planning. Approximately 64 percent of the institutions with university-wide strategic plans have IRM organizations. Some 82 percent of the units that use a formal model for information technology planning are IRM organizations. Finally, individuals who refer to themselves as CIOs are more likely to have strategic plans for information technology.

Table 9

**CIO Functions by Organization Type**

('Total' Percents Based on Fifty-two Respondents)

| CIO Functions | Total | IRM | CIO | Other |
|---|---|---|---|---|
| 1 Leadership | 42/80.8% | 23/76.7% | 13/81.3% | 06/100% |
| 2. Planning | 37/71.2% | 23/76.7% | 10/62.5% | 04/66.7% |
| 3. Communication/Liaison | 32/61.5% | 20/66.7% | 08/50.0% | 04/66.7% |
| 4. Vision | 18/34.6% | 08/26.7% | 07/43.8% | 03/50.0% |
| 5. IS Budget Management | 18/34.6% | 10/33.3% | 05/31.3% | 03/50.0% |
| 6. Coordination | 12/23.1% | 06/20.0% | 04/25.0% | 02/33.3% |
| 7. Technical Expertise | 08/15.4% | 02/06.7% | 04/25.0% | 02/33.3% |
| 8. Consensus Building | 07/13.5% | 04/13.3% | 03/18.8% | 0 |
| 9. Problem Solving | 04/07.7% | 04/13.3% | 0 | 0 |
| 10. All Other Functions | 03/05.8% | 02/06.7% | 01/06.3% | 0 |
| Total (6 did not respond) | 52/100% | 30/57.7% | 16/30.8% | 06/11.5% |

What are the characteristics of a successful CIO? The survey asked CIOs to list the top four characteristics needed to do their job. "A communicator with good interpersonal skills" topped the list, cited by thirty-nine (73.6 percent) of the fifty-three CIOs responding to this question. "Good general manager" was cited by thirty-two (60.4 percent), "technical competence" by twenty-eight (52.8 percent), "vision for information technology" by twenty-two (41.5 percent), "negotiator and consensus builder" by twenty (37.7 percent), "global institutional view" by fourteen (26.4 percent), "leader" by ten (18.9 percent), "planner" by seven (13.2 percent), and the traits of perseverance and energy by six (11.3 percent).

What roles are CIOs expected to play? Respondents were requested to rank in order a list of statements describing the role that their senior administration expects them to play. Responses generated the following, beginning with the top ranked: provide leadership on technological issues, coordinate and integrate technology initiatives, develop a strategic planning process for information resources, formulate information technology policy, make the important technology decisions, "fix" information resource problems, relieve [top executives] from worrying about technological issues, and authorize information technology purchases by user departments.

Relating these rankings with CIO characteristics, activities, and functions indicates a consistency of response and provides a fairly comprehensive list of descriptors for defining a typical CIO position.

### CIO Salaries

Good data were not available to enable a solid comparison of salary levels between business, health care, and higher education CIOs. From the sparse information that was found, it appears that general salary patterns for senior level management positions hold true. CIOs in business are paid at significantly higher levels than are their counterparts in health care or higher education. The average annual compensation (including bonuses) for industry CIOs in 1988 was $162,000; for health care CIOs in 1987, $71,320; and for higher education CIOs in 1988, $87,895.[54] However, considering that almost 42 percent of the health care CIOs reported getting a cash bonus averaging $7,670 in addition to base salary and adjusting for the difference between 1987 and 1988 statistics, annual income between health care and higher education CIOs would appear to be fairly comparable.[55]

The median salary from our survey for CIOs with the title of vice president or vice chancellor was $103,571 (mean = $92,800). Median salaries for CIOs with the titles assistant/associate vice president/chancellor were $95,000 (mean = $86,667), and $83,000 (mean = $78,182) for all other titles.

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[54]"News and Comments: Tech Trends," *Information Center*, December 1989, p. 4; and Heidrick & Struggles, p. 3.

[55]Heidrick and Struggles, p. 3.

Table 10

**CIO Activities by Organization Type**

('Total' Percents Based on Fifty-one Respondents)

| CIO Functions | Total | IRM | CIO | Other |
|---|---|---|---|---|
| 1 Human Resource Mgt. | 41/80.4% | 22/78.6% | 13/81.3% | 06/85.7% |
| 2. Planning/Strategizing | 31/60.8% | 17/60.7% | 10/62.5% | 04/57.1% |
| 3. Vendor Relations | 30/58.8% | 17/60.7% | 11/68.8% | 02/28.6% |
| 4. Meetings | 30/58.8% | 15/53.6% | 09/56.3% | 06/85.7% |
| 5. Budgeting | 21/41.2% | 10/35.7% | 07/43.8% | 04/57.1% |
| 6. Keeping Current | 15/29.4% | 07/25.0% | 05/31.3% | 03/42.9% |
| 7. Telephone Calls | 07/13.7% | 02/07.1% | 04/25.0% | 01/14.3% |
| 8. Crisis Management | 05/09.8% | 05/17.9% | 0 | 0 |
| 9. All Other Functions | 07/13.7% | 06/21.4% | 01/06.3% | 0 |
| Total (7 did not respond) | 51/100% | 28/54.9% | 16/314% | 07/13.7% |

Table 11

**CIO Salaries by Institution Type**
(Percents Based on Fifty-seven Respondents)

| | | Public | |
|---|---|---|---|
| Comprehensive | mean = $74,286<br>n = 7<br>median = $72,500 | mean = $80,909<br>n = 11<br>median = $80,000 | mean = $78,333<br>n = 18<br>median = $75,000 |
| Research | | mean = $93,529<br>n = 17<br>median = $96,000 | |
| Other | mean = $75,000<br>n = 6<br>median = $70,000 | mean = $80,000<br>n = 3<br>median = $80,000 | mean = $76,667<br>n = 9<br>median = $73,333 |
| All | | mean = $87,742<br>n = 31<br>median = $89,167 | |

**Trends and issues**

CIOs were asked to list the top four information technology trends impacting their institution. The trends in rank order based on the responses of fifty-two CIOS: networking, with thirty-three responses (63.5 percent); increased workstation computing, twenty-nine (55.8 percent); increased access to databases, eighteen (34.6 percent); distributed computing, seventeen (32.7 percent); voice/data communications, sixteen (30.8 percent); imaging/new video applications, twelve (23.1 percent); increased academic computing, seven (13.5 percent); rising expectations, six (11.5 percent); increasing and new costs, five (9.6 percent); increased human resource needs, three (5.8 percent); and technological obsolescence, three (5.8 percent).

They were also asked to rank in order a given set of information management issues taken from *The EDUTECH Report.*[56] The resulting ranking in order of importance is: resources (how to pay for growing demands), networking, integrating computing into the curriculum, staffing issues, microcomputer support, organizational issues, desktop MIS for administrators, buying or building software, faculty writing software, added responsibilities, and studies of the effect of computerization.

Comparison of the two lists, trends versus issues, again shows considerable overlap and consistency of response.

[56]Linda H. Fleit, "Hot Issues 1988-1989," *The EDUTECH Report,* September 1988, pp. 1, 6-7.

**Other Findings**

Our findings would suggest that the CIOs in our study who either report to the president/chancellor or are executive officers of the institution are different from others in a variety of ways. Those who report to the president are more likely to head an IRM-type organization. Approximately 71 percent of all those who report to the president are in IRM organizations. The CIOs in our study who report to the president or are executive officers are more likely to approve institution-wide information technology purchases. CIOs who report to the president are more likely to have more administrative and other staff, while CIOs who do not report to a president are more likely to have more technical staff. Those who report to the president are more likely to be from smaller institutions, as are those who are executive officers. Executive officer CIOs tend to have been in current positions fewer years, have larger unit budgets, larger staffs, and do more consulting. CIOs in our study who report to the president are more likely to be an executive officer. Finally, two thirds of those who report to the president also hold academic rank.

CIOs who hold academic rank are more likely to be at smaller institutions, to have been in the current position longer, and to have larger technical and other staffs. They are also more likely to have an oversight committee that deals with both policy and operational issues. As might be expected, CIOs with tenure tend also to be from smaller institutions, to have been in the current position longer, and to have larger technical and other staffs. CIOs who lead CIO-type units tend to be younger than those who lead IRM-type organizations, and they, in turn, are likely to be younger than CIOs leading other-type units.

# 4
# Concluding Observations

*"The cowards never start and the weak die along the way."*
—Kit Carson

In retrospect, we have concluded that our CIO survey had several weaknesses that need to be acknowledged. Our methodology for identifying potential recipients of our survey (see footnote 9, page 2, for details) may have permitted sources of bias in the research results. Perhaps the most serious of these is the probability of significant underrepresentation of institutions that historically do not attend national conferences as often as others—for example, perhaps, small institutions, liberal arts colleges, and community colleges. The breakout of respondents presented in Table 6 (page 13) and the distribution of head-count enrollment indicate that this bias may well be present. On the other hand, it may be that these same kinds of institutions are also more likely to have less complex organizational structures and thus may be less likely to have CIOs, so it is not clear how serious a problem this may be.

As is often the case in surveys of this type, some of the questions were interpreted differently by respondents. That was especially true regarding subunit budget data requested in survey question #18, so we attempted no meaningful analysis for that question. Since few respondents were able to supply an answer to question #19 regarding how much is spent on information resources outside of their unit, we also did not analyze responses to that question. Although it is not surprising that these data were not available, that fact is significant. Many colleges and universities, even those with CIOs, do not know how much is really spent on information technology.

Although we made every effort to be impartial with respect to the open-ended questions, it certainly is possible that an element of subjectivity crept into our manual classifications and groupings. Finally, the respondents were self-selected and the response rate was not as high as we would have liked. All of these factors should be considered in examining and interpreting the results reported here. Despite these drawbacks, we believe that the survey provides useful information and a realistic scenario of the CIO phenomenon in higher education. It is, in short, a beginning, and we hope to pursue a similar survey in the future, having learned some valuable lessons from this initial endeavor.

**Survey Findings Versus the Literature**

No startling revelations are evident from the results of our CIO survey. Indeed there is a consistency exhibited whether one examines the profile of CIOs in business, health care, or higher education, or looks at major issues, or contrasts reporting structures. The CIO tends to be a white male, in his mid 40s, with a vice presidential title, reporting to the chief executive or chief operating officer, in his position for three to five years, and the first person to fill the CIO role in the organization. Major issues or concerns are: communication, technology integration, resource management, and providing vision and leadership. Units which typically report to a CIO are: computing or information systems, telecommunications, information technology planning, and a variety of other functions dependent upon the specific company, health care facility, or college or university.

The literature suggests that CIO positions are "maturing." Comparison of our survey with the work of Woodsworth from the mid-1980s indicates the same maturation is occurring in colleges and universities. Over 40 percent of the CIOs surveyed in 1989 report to the president compared to under 30 percent earlier. Approximately 88 percent now have a policy committee versus 39 percent before. Almost 36 percent of the Woodsworth CIOs held degrees in computing, engineering, or physics compared to about 28 percent in our survey. The highest ranked activities of CIOs in 1989 are leadership/management, planning, and communication contrasted with hardware/software purchases, contracts, and formulation of policies in 1985/86.

There are major differences between CIOs and their roles in business, health care, and higher education. Examples of these differences include salary structure, profit motivation versus non-profit enterprise, magnitude of budgets, and types of management applications (large databases with high volume transactions and a moderate number of systems, contrasted with smaller databases with lower volume trans-

actions but a larger number of systems). Such examples seem to be reflective of the basic differences between the enterprises rather than functions of the CIO position.

**Notable Findings**

Several findings from the survey would seem to define the type of individuals who assume the role of CIO in higher education and provide information about the institutions that they serve.

- Individuals in the position are relatively happy being CIOs. Only twelve respondents (20.7 percent) indicated professional aspirations toward seeking another kind of position. Several others indicated desire to be a CIO at a larger, a more prestigious, or a better-funded institution.
- The self-reported CIO management styles are remarkably similar and very people-oriented: strategically focused, highly participative in planning and decision-making, and oriented toward empowering others (subordinates and end users).
- Organizations led by CIOs are dedicated to providing a high level of service. The CIOs see this as a distinguishing characteristic from other organizations.
- The CIO reading list is reasonably diversified. The most-read publication targets higher education in general, two are computer/information technology industry publications, one is a general publication focusing on business and finance, and one dedicated to the management of information technology in higher education.
- Six of the ten institutional strengths/weaknesses listed are simply different sides of the same coin (see pages 14-15). This list would seem to form a core of critical success factors for CIOs.
- Some 80 percent of the survey respondents indicated that strategic planning for information technology is part of their role. Approximately 65 percent have strategic plans for information resources and 43.1 percent have institutional strategic plans, but only 19 percent utilize formal planning methodologies. This may indicate that CIOs are not as well versed in strategic planning techniques as they need to be, or that their institutions may not be placing a high priority on strategic planning in general.
- Our data show a very good alignment between CIO functions, characteristics, and activities. Thus it appears that they generally do what they intend.
- Being an executive officer of the institution provides a CIO with a greater means to "make things happen" than any other single variable. Reporting to the president is a close second.
- There is a strong correlation between reporting to the president, being a vice president, and leading an IRM-type organization. Institutions with this set of characteristics are more likely to have a university-wide strategic plan and to utilize a formal planning model.

There was almost no mention of *evaluation* in either the literature or in responses to survey questions. This might indicate an area in which considerable work needs to be done.

**Personal Observations**

It appears as if basically three types of CIOs now exist in higher education. First are CIOs who are policy officers reporting to the president/chancellor or the chief operating officer (provost or executive vice president). Many times such individuals are also executive officers of the institution, have line responsibility for the majority of information technology resources in the college or university, and have policy control (through purchasing approval) for the remainder. They interact daily with executive officers and deans participating in a broad array of decision-making. The institution likely regards information technology as a strategic resource, wishes to maintain at least a "near follower" information technology strategy, and has committed resources to do so. The organization type is IRM or CIO. Planning is valued throughout the institution and the CIO is responsible for maintaining a strategic plan for information technology. The institution has an executive level policy committee and one or more operational committees which focus upon IRM issues.

The second type of CIO is also a policy officer, probably reporting to the provost or executive vice president, and may or may not be an executive officer. He/she has line responsibility for substantial information resources, but many times major information technology units report elsewhere. The institution is likely to be large and/or a major research university with a strong commitment to a "leading edge" or "near follower" strategy. There is defined funding from the institution and the major schools. The CIO interacts often with executive officers and deans, is expected to provide vision and leadership (probably through a meaningful planning process), but does not have policy control of information resource purchasing. The organization type is CIO or a limited IRM. An executive level policy committee that may appoint ad hoc committees to deal with needed operational issues (where there is no standing operational committee) provides oversight for information technology.

Finally, there are CIOs who are senior administrators who may or may not be policy officers but usually are not institutional executive officers. They are not likely to often interact with executive officers except when there are difficulties or at budget time. They may be regarded as "hired guns" responsible for fixing problems with academic and administrative computing, data processing, and phone

operations so that the executive officers do not have to worry about these areas. The institutional strategy toward information technology is undefined or "don't ask for a Cadillac if we can make do with a Yugo." It is unlikely that an institutional plan exists, but an information technology plan is desired. The plan and the process for deriving it are the total responsibility of the CIO. There is likely a joint policy and operational committee for information resources with some influential faculty representation. The organization type may be IRM, CIO, or other, but unit groupings may be more dependent upon historical culture than on an information management rationale.

If this classification scheme has any merit, it is to provide some insight into the current state of the CIO in higher education and perhaps offer a hint of the future. The first two types of CIO demonstrate different approaches to dealing with the revolutionary change that information technology is bringing to colleges and universities. They also illustrate that the "best" approach is very dependent upon the particular institution and requires both institutional thought and commitment before it is put into practice. The third CIO type provides evidence as to why the debate regarding the usefulness of CIO positions has not yet been terminated.

There is a growing number of specific colleges or universities with established CIO positions and a few years' history of notable achievement in employing information technology to real advantage. In most cases, the individuals who occupy these positions are well known, respected, professionally pleased with their work, and coveted (even sought) by other institutions or organizations. These institutions recognize that significant change requires human and financial resources, and that information is now one of the primary resources available. The CIO position will not diminish or disappear in such places.

Realistically, there are probably more institutions than we would like to believe that fit the descriptors of the third example. Success is far less likely in such situations. Where there have been positive experiences, they are most probably due to the efforts of a personality with charisma, unusual administrative skills, or both. It is also very possible that the information technology leaders in these colleges and universities are well known, respected, and sought after, yet are neither secure nor professionally pleased in their current position. When people like this leave their institution, finding a successful replacement may not be easy. Therefore, there would seem to be three scenarios for the future in such cases:

(1) After the CIO moves elsewhere, a replacement is not found; thus, the institution determines that there just are not enough good CIOs around and takes another direction.

(2) A new CIO is hired but he or she cannot maintain a positive environment and the university determines that the original idea of a CIO was a bad concept.

(3) The administration reexamines the situation, finds that many of the factors felt to be necessary to ensure a CIO's success are missing, and commits to correcting the circumstance.

Given these scenarios, it is likely that some CIO positions will be eliminated. However, we do think the next generation of college presidents will be more inclined to create administrative environments more supportive of CIO positions.

In conclusion, not all colleges and universities want or need a CIO. The criteria for those that do are reasonably well established. They are institutions that: (1) have an information technology strategy; (2) have made a commitment to fund that strategy; (3) recognize that information is a real resource; and (4) given the preceding three conditions, decide that having a CIO is the best way to provide management to achieve the strategy. It must be noted that there are well respected institutions that would subscribe to all these tenets except the last. Colleges or universities that must, or choose to, employ a principle of leveraging resources are most inclined to endorse them all, including the desirability of a CIO.

Today, we believe that no more than one third of the higher education institutions in the nation have or offer the potential for CIO positions. Over the next decade, this potential may well grow to close to one half of the colleges and universities in the country. If this prediction comes close to being true, individuals with the necessary education, background, and skills who aspire to leadership in information resources units have a bright future. By the same token, institutions creating CIO positions during the 1990s will find it more and more difficult to recruit people who can adequately respond to the demands of the function.

Are CIOs in higher education evolutionists or revolutionists? They must be both. Their ability to pick and choose which tactic to employ and when to employ it determines their success. Some of the findings of this survey indicate that many of the respondents may be adept in making such choices.

It is our hope that the profession will evolve fast enough, both in numbers and in administrative acumen, to keep pace with the change, and consequent needs, wrought by the continuing revolution of information technology. We believe that higher education clearly will benefit as the profession advances.

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# Appendix:
# CIO Survey Questionnaire and Results

**All percents have been rounded to the nearest tenth of a percent, and are calculated on N=58 unless otherwise noted.**

Do you refer to yourself as a Chief Information Officer (CIO)?

Yes - 44 (75.9%) No - 13 (22.4%) Did not respond - 1 (1.7%)

1. What is your title?

| | | |
|---|---|---|
| Vice Chancellor | 1 | (1.7%) |
| Associate Vice Chancellor | 1 | (1.7%) |
| Assistant Vice Chancellor | 2 | (3.4%) |
| Assistant Chancellor | 1 | (1.7%) |
| Vice Provost | 2 | (3.4%) |
| Associate Provost | 3 | (5.2%) |
| Assistant Provost | 1 | (1.7%) |
| Vice President | 19 | (32.8%) |
| Associate Vice President | 8 | (13.8%) |
| Assistant Vice President | 3 | (5.2%) |
| Dean | 1 | (1.7%) |
| Director | 9 | (15.5%) |
| Did not respond | 7 | (12.1%) |

2. What was the title of the position you held previously?

| | | |
|---|---|---|
| Associate Vice Chancellor | 2 | (3.4%) |
| Assistant Vice Chancellor | 2 | (3.4%) |
| Assistant Chancellor | 1 | (1.7%) |
| Vice Provost | 2 | (3.4%) |
| Associate Provost | 1 | (1.7%) |
| Vice President | 3 | (5.2%) |
| Associate Vice President | 4 | (6.9%) |
| Assistant Vice President | 5 | (8.6%) |
| Director | 23 | (39.7%) |
| Associate Dean | 1 | (1.7%) |
| Faculty | 2 | (3.4%) |
| Associate Director | 2 | (3.4%) |
| Manager | 2 | (3.4%) |
| Technical | 2 | (3.4%) |
| Did not respond | 6 | (10.3%) |

3. How many years have you held your current position?

| | | |
|---|---|---|
| Less than 3 years | 27 | (46.6%) |
| 3 to 5 years | 25 | (43.1%) |
| More than 5 years | 6 | (10.3%) |

4. To whom do you report?

| | | |
|---|---|---|
| President/Chancellor | 23 | (39.7%) |
| Executive/Other Vice President | 21 | (36.2%) |
| Provost/Academic Vice President | 11 | (19.0%) |
| Other | 3 | (5.2%) |

5. Do you have academic rank?

| | | |
|---|---|---|
| Yes | 30 | (51.7%) |
| No | 28 | (48.4%) |

Do you have academic tenure or the equivalent?

| | | |
|---|---|---|
| Yes | 20 | (34.5%) |
| No | 38 | (65.5%) |

Please specify the school or department in which you hold rank.

| School | Respondents | Percent |
|---|---|---|
| Business | 3 | 5.2% |
| Communications | 1 | 1.7% |
| Education | 1 | 1.7% |
| Engineering | 1 | 1.7% |
| Medicine | 2 | 3.4% |
| Science | 2 | 3.4% |

(The other 20 who answered "yes" to academic rank did not specify a school or department.)

6. Are you an executive officer of the institution?

| | | |
|---|---|---|
| Yes | 34 | (58.6%) |
| No | 24 | (41.4&) |

Do you attend board or regent meetings regularly?

| | | |
|---|---|---|
| Yes | 28 | (48.3%) |
| No | 30 | (51.7%) |

If yes, do you attend as observer, participant, or resource person?

| Role | Respondents | Percent (of 28) |
|---|---|---|
| Observer | 2 | 7.1% |
| Participant | 9 | 32.1% |
| Resource person | 10 | 35.7% |
| Observer/participant | 1 | 3.6% |
| Participant/resource person | 1 | 3.6% |
| Observer/participant/resource person | 4 | 14.3% |
| Did not specify | 1 | 3.6% |

7. Do you participate in executive decisions that are not information resources oriented?

| | | |
|---|---|---|
| Yes | 38 | (65.5%) |
| No | 20 | (34.5%) |

If yes, please specify. **Responses included the following:**

Participate in setting institutional strategic plan
Academic affairs decision processes
Member of Academic Affairs Cabinet, Chancellor's Directorate
Extended campus decisions
Member of UniversityAdministrative Council, Human Resources Council, Dean's Council/Budget Group
As a member of the President's senior staff
Any strategy that I feel I should comment on
Involved in budget preparation, member of President's Council and Council of Vice Presidents
Research initiatives, key personnel hiring, general management
Strategic business planning, space, budget operations
Institutional research, continuing studies, planning
Member of Chancellor's staff
Budget, planning, human resources
Participative decision structure here
Financial decisions
General administrative matters
Human resources and facilities
All decisions
Part of Dean's Council
All administrative decisions
Building expansion, human resource plans, curricular endeavors, Budget Council
Member President's Cabinet
General administration, facilities, budget
President's staff on planning and budgets
Member University Executive Council
Planning, budgets, wide range of policy decisions
Graduate studies, sponsored research, library
All administrative and academic areas
Head of Math Department
Financial, research policy, others
Member of President's Cabinet—all decisions that come to the group

8. What is your primary background?

| | | |
|---|---|---|
| Administrative | 28 | (48.3%) |
| Academic | 22 | (37.9%) |
| Technical | 8 | (13.8%) |

9. Please describe the primary elements of your management style below.

**Respondents used the following phrases to describe their management styles:**

Annual budget development cycle
Coordinate with division heads in matrix fashion
Focus on objectives
Professional staff vital resources
Assemble the team and let them run but insist on accountability
Broad delegation of authority, careful review of fiscal matters
Communicate, delegate, coordinate
Consensus building
Consensus building, team management
Consult and delegate
Contingent—use approach that best fits situation/mission; decentralized—delegate decision-making and focus on influencing planning
Courteous, honest, fair, professional with staff, users, colleagues; seek information; listen to staff and users
Delegate to line officers; action-oriented decision-making; develop alternatives, make decisions, plan, emphasize human resources
Delegate responsibility and authority—as appropriate—to a number of directors with follow-up and review
Delegation of administrative computer service support to assistant director (emphasis on planning); measurable objectives, accountability, and assessment
Top-down parameters, bottom-up action plans
Foster collaborative decision-making environment; delegate responsibility for implementation; direct participation in planning, assessment
Get the job done, problem-solver, goal-oriented, open door, project accountability, open communications
Group participation in program planning, committees set technical direction and build consensus, service-orientation
Highly organized but flexible; democratic/consensus building where possible; open door

10. Describe your unit's service orientation.

**Respondents used the following to describe service orientation:**

#1 priority—make sure everything runs correctly; then use path of least resistance
100% service, no other function
Service distinguishes us from similar institutions
Training and access are most important service priorities
Academic service akin to library
Unique role of developing infrastructure, but most needs addressed come from user
Provide academic and administrative computing and support
We support academic computing, administrative computing, office administration and automation, voice and data communications, networking for academic computing
Central university computing and communications, printing, mail service, communications and network services, instructional and research information services, administrative information services, library system administration, completely service oriented
We serve, we try to facilitate, we try to ease impediments to computer services and data communications services; computer and data communications acquisitions reviewed for all academic units; responsible for computing and telecommunications services, networking (high speed) services
In-house consulting, consider users both customer and collaborator; balance with support for staff professional growth; ensure good institutional balance of resources to empower individuals and work groups
Existence justified based on services offered; seek to understand user expectations, perceptions; conduct ongoing service evaluation
Have not developed a policy that quantifies various levels of service
Service helps develop appreciation for IT resources use to further mission

Facilitate research and faculty meeting objectives; balance responsiveness to user needs; we provide technical leadership, cost containment, a fully developed help desk, a fully functional user services organization that goes beyond information center

Outreach is vital; we offer full range of service and Technology Assisted Learning Centers

See to it that customers get what they need as well as what they want

We provide high quality service and follow-up; unit has esprit de corps, high visibility; we provide quick response, and focus on problem-solving; user services unit helps end users; administrative applications teams are moving from control to user service—end-user sensitive, moving toward information service utility—service level agreements, user funding of service increases, greater outreach operation, education, training, and systems development

Key partners are in administrative and academic units; each unit has advisory groups of partners/clients; planning and coordination of system wide services promotes effective use of information technology; provide consulting training support service, assure reliable, stable service

Provide computing services; telecommunications services (voice, data, video); user support; database administration provide highest quality service

Use advisory groups and formal surveys to gauge satisfaction providing voice, data, and video services and support to seven campuses and three district offices

Service is our business (and top priority)

Service to state network academic users, local academic and administrative computing

Service to users is high priority

Support University mission; provide technical aid to people in their jobs, offer training, "help line"; support university's principal mission of teaching, research, and service

Total service emphasis; if we can't do it better, faster, cheaper than alternatives, then we shouldn't do it.

User-driven; minimize restrictions; use persuasion to get funds/resources and put them where university priorities dictate

11. Specify your degrees and academic majors.

**All fifty-eight respondents (100.0%) indicated bachelor's degrees. Breakdown by major is as follows:**

| | | | |
|---|---|---|---|
| Accounting | 1 | History | 1 |
| Aeronautics/Astronautics | 1 | Management | 1 |
| Agronomy/Chemistry | 1 | Marketing | 1 |
| Anthropology | 1 | Math/Physics | 2 |
| Biology | 1 | Mathematics | 12 |
| Business Management | 1 | Physics/Chemistry | 1 |
| Chemistry | 3 | Political Science | 2 |
| Commerce | 1 | Psychology | 1 |
| Communications | 1 | Psychology/LAS | 1 |
| Economics | 5 | Public Accounting | 1 |
| Engineering | 13 | Sociology | 1 |
| Finance | 1 | Statistics | 1 |
| | | Did not specify major | 3 |

**Forty-six of the fifty-eight respondents (79.3%) indicated they hold master's degrees, while twelve (20.7%) do not. Five of the respondents (8.6%) hold more than one master's, for a total of fifty-three master's degrees.**

| | | | |
|---|---|---|---|
| Aeronautics/Astronautics | 1 | Engineering | 7 |
| Agronomy/Chemistry | 1 | Industrial Administration | 1 |
| Biology | 1 | Information Science | 2 |
| Biostatistics | 2 | Mathematics | 8 |
| Business Administration | 11 | Operation Research | 1 |
| Chemistry | 1 | Philosophy | 1 |
| Communication | 2 | Physics | 1 |
| Computer Science | 3 | Psychology- Human Factors | 1 |
| Education | 1 | Public Administration | 1 |
| Education (Stats/Meas) | 1 | Social Psychology | 1 |
| Educational Administration | 1 | Did not specify major | 4 |
| | | Do not have master's | 12 |

**Thirty-six of the fifty-eight respondents (62.1%) indicated they have doctoral degrees, while twenty-two (37.9%) do not. One of the respondents has two doctoral degrees, for a total of thirty-seven doctorates.**

| | | | |
|---|---|---|---|
| Administration | 2 | Information Science | 1 |
| Aeronautics/Astronautics | 1 | Institutional Management | 1 |
| Agronomy/Chemistry | 1 | Management | 1 |
| Biostatistics | 1 | Marketing/Statistics | 1 |
| Chemistry | 2 | Math/Applied Math | 3 |
| Computer Science | 4 | Personnel Management | 1 |
| Continuing Medical Ed | 1 | Physics | 1 |
| Economics | 2 | Psychology | 1 |
| Engineering | 4 | Public Administration | 1 |
| Fluid Mechanics | 1 | Statistics | 1 |
| Higher Education Admin | 1 | Did not specify area | 5 |
| | | Do not have doctorate | 22 |

12. What is your age?

| | | |
|---|---|---|
| Under 45 | 11 | 19.0 % |
| 45 to 49 | 23 | 39.7% |
| 50 to 54 | 17 | 29.3% |
| 55 and over | 7 | 12.1% |

Gender?

| | | |
|---|---|---|
| Male | 54 | 93.1% |
| Female | 4 | 6.9% |

Ethnic background? (Check one only)

| | | |
|---|---|---|
| Asian | 0 | |
| Black | 0 | |
| Caucasian | 57 | 98.3% |
| Hispanic | 0 | |
| Other | 1 | 1.7% |

13. Please indicate your salary level.

| | | |
|---|---|---|
| Under $65,000 | 6 | 10.3% |
| $65,000 - $74,999 | 11 | 19.0% |
| $75,000 - $84,999 | 9 | 15.5% |
| $85,000 - $94,999 | 6 | 10.3% |
| $95,000 - $104,999 | 13 | 22.4% |
| $105,000 and up | 12 | 20.7% |
| Did not respond | 1 | 1.7% |

14. Please indicate whether your institution is:

| Institution Type | Respondents | Percent |
|---|---|---|
| Public | 32 | 55.2% |
| Private | 26 | 44.8% |
| Comprehensive University | 19 | 32.8% |
| Research University | 30 | 51.7% |
| Liberal Arts College | 4 | 6.9% |
| Other | 5 | 8.6% |

(Community College—2; Technology Institute—2; Medical School—1)

15. What is your institution's student headcount enrollment?

| Headcount Enrollment | Respondents | Percent |
|---|---|---|
| Under 2,000 | 18 | 31.0% |
| 2,000-4,999 | 0 | 0% |
| 5,000-9,999 | 0 | 0% |
| 10,000-14,999 | 10 | 17.2% |
| 15,000-19,999 | 3 | 5.2% |
| 20,000-24,999 | 5 | 8.6% |
| Over 25,000 | 16 | 27.6% |
| Did not respond | 6 | 10.3% |

16. How many faculty does your institution have?

| Full-Time Faculty | Respondents | Percent |
|---|---|---|
| Less Than 500 | 12 | 20.7% |
| 500 to 1,000 | 16 | 27.6% |
| 1,000 to 2,000 | 12 | 20.7% |
| Over 2,000 | 10 | 17.2% |
| Did not respond | 8 | 13.8% |
| **Part-Time Faculty** | **Respondents** | **Percent** |
| Less Than 500 | 27 | 46.6% |
| 500 to 1,000 | 6 | 10.3% |
| 1,000 to 2,000 | 3 | 5.2% |
| Over 2,000 | 2 | 3.4% |
| Did not respond | 20 | 34.5% |

17. What is your institution's total annual budget?

| Institutional Budget | Respondents | Percent |
|---|---|---|
| Under $100 Million | 16 | 27.6% |
| $100 to 199 Million | 6 | 10.3% |
| $200 to 299 Million | 8 | 13.8% |
| $300 to 399 Million | 8 | 13.8% |
| Over $400 Million | 14 | 24.1% |
| Did not respond | 6 | 10.3% |

18. What is the total budget for your unit?

| Unit Budget | Respondents | Percent |
|---|---|---|
| Under $1 Million | 3 | 5.2% |
| $1 to 5 Million | 16 | 27.6% |
| $5 to 10 Million | 8 | 13.8% |
| $10 to 20 Million | 14 | 24.1% |
| Over $20 Million | 4 | 6.9% |
| Did not respond | 13 | 22.4% |

Please specify the percentage spent on the following subunits.
***Due to differences in interpretation of this question among respondents, no analysis was attempted.***

19. How much does your institution spend on information resources in addition to what is allocated to your unit?
***Because few respondents were unable to supply an answer to this question, no analysis was attempted.***

20. Which of the following do you supervise? (Check all that apply)

| Unit | Respondents | Percent |
|---|---|---|
| Data Communications | 56 | 96.6% |
| Administrative Computing | 52 | 89.7% |
| Academic Computing | 50 | 86.2% |
| Voice Communications | 40 | 69.0% |
| Planning | 19 | 32.8% |
| Television Services | 16 | 27.6% |
| Institutional Research | 11 | 19.0% |
| Printing | 10 | 17.2% |
| Mail Services | 10 | 17.2% |
| Copying/ReprographicServices | 10 | 17.2% |
| Media Services | 9 | 15.5% |
| Library | 9 | 15.5% |

21. How many staff are in your unit(s)?

| Total Staff | Respondents | Percent |
|---|---|---|
| Under 50 | 15 | 25.9% |
| 50 to 100 | 14 | 24.1% |
| 100 to 199 | 14 | 24.1% |
| 200 to 299 | 8 | 13.8% |
| Over 300 | 4 | 6.9% |
| Did not respond | 3 | 5.2% |

22. Do you have a formal strategic plan for information resources?

| | | |
|---|---|---|
| Yes | 39 | (67.2%) |
| No | 19 | (32.8%) |

Would you be willing to share it with others? (Percents based on 39 who replied yes.)

| | | |
|---|---|---|
| Yes | 34 | (87.2%) |
| No | 5 | (12.8%) |

23. Do you have a formal strategic plan for your institution as a whole?

| | | |
|---|---|---|
| Yes | 25 | (43.1%) |
| No | 33 | (56.9%) |

Would you be willing to share it with others? (Percent based on 25 who replied yes.)

| | | |
|---|---|---|
| Yes | 25 | (100.0%) |

Do you use a formal planning model? (Percents based on 25 who have strategic institution plans.)

| | | |
|---|---|---|
| Yes | 11 | (44.0%) |
| No | 14 | (56.0%) |

If yes, identify by name. (Percents based on 11 who indicated a formal planning model.)

| Model | Respondents | Percent (of 11) |
|---|---|---|
| Shirley "NCHEMS" | 5 | (45.5%) |
| IBM Business Systems Planning Methodology | 1 | (9.1%) |
| Homegrown | 2 | (18.2%) |
| Blank | 3 | (27.3%) |

(Three of the eleven who indicated a formal planning model did not identify it.)

Who is responsible for coordinating the institutional planning process?

| Planning Coordinator | Respondents | Percent |
|---|---|---|
| President/Chancellor | 7 | 12.1% |
| Provost/VPAA | 8 | 13.8% |
| Other VP/Vice Chancellor | 8 | 13.8% |
| Planning Officer | 7 | 12.1% |
| Committee | 3 | 5.2% |
| CIO | 3 | 5.2% |
| Other | 4 | 6.9% |
| Did not respond | 18 | 31.0% |

24. Do you have an advisory committee(s) for information technology?

| | | |
|---|---|---|
| Yes | 54 | (93.1%) |
| No | 4 | (6.9%) |

If yes, is it operational, policy-making, or both? (Percents based on 54 who replied yes.)

| | | |
|---|---|---|
| Operational | 3 | (5.6%) |
| Policy | 18 | (33.3%) |
| Both | 33 | (61.1%) |

If yes, are you satisfied with the activity of the committee(s). (Percents based on 54 who replied yes.)

| | | |
|---|---|---|
| Yes | 22 | (40.7%) |
| No | 7 | (13.0%) |
| Somewhat | 16 | (30.0%) |
| Did not respond | 9 | (16.7%) |

25. List the top four strategic issues relating to technology that your institution now faces.

| Strategic Issues | Respondents | Percent |
|---|---|---|
| Networking: providing network infrastructure linkages to the network, connectivity, LANs | 30 | 51.7% |
| Integration of technology into the curriculum, with each other, into management/administration | 28 | 48.2% |
| Resources for acquisition, operations, replacement (includes standards to maximizing investment) | 26 | 44.8% |
| Providing technology and training in support of instruction (curriculum), research, scholarship | 22 | 37.9% |
| Organization and planning | 7 | 12.1% |
| Library automation | 6 | 10.3% |

26. List the top four most important characteristics needed to do your job.

| Characteristics | Respondents | Percent (of 53) |
|---|---|---|
| Communication/Interpersonal Skills | 39 | 73.6% |
| Good General Management Skills | 32 | 60.4% |
| Technical Competence/Knowledge | 28 | 52.8% |
| Vision for Information Technology | 22 | 41.5% |
| Negotiating/Consensus Building | 20 | 37.7% |
| Global Institutional View | 14 | 26.4% |
| Leadership | 10 | 18.9% |
| Planner | 7 | 13.2% |
| Perseverance/Energy | 6 | 11.3% |
| Total Respondents | 53 | |

27. List the top four activities on which you spend your time.

| Activities | Respondents | Percent (of 51) |
|---|---|---|
| Human Resource Management | 41 | 80.4% |
| Planning/Strategizing | 31 | 60.8% |
| Vendor Relations | 30 | 58.8% |
| Meetings | 30 | 58.8% |
| Budgeting | 21 | 41.2% |
| Keeping Current | 15 | 29.4% |
| Telephone Calls | 7 | 13.7% |
| Crisis Management | 5 | 9.8% |
| All Other Functions | 7 | 13.7% |
| Total Respondents | 51 | |

28. List the top four publications which you regularly read.

| Publication | Respondents | Percent (of 53) |
|---|---|---|
| The Chronicle of Higher Education | 24 | 45.3% |
| Computerworld | 19 | 35.8% |
| Wall Street Journal | 12 | 22.6% |
| Datamation | 10 | 18.9% |
| CAUSE/EFFECT | 10 | 18.9% |
| InformationWeek | 8 | 15.1% |
| EDUCOM Bulletin | 8 | 15.1% |
| Infoworld | 6 | 11.3% |
| MIS Week | 6 | 11.3% |
| PC Week | 6 | 11.3% |
| Business Week | 6 | 11.3% |
| CIO Magazine | 5 | 9.4% |
| Total Respondents | 53 | |

29. List the professional organizations most important to you.

| Organization | Respondents | Percent (of 52) |
|---|---|---|
| EDUCOM | 41 | 78.8% |
| CAUSE | 35 | 67.3% |
| ACM | 13 | 25.0% |
| Society for Information Management | 5 | 9.6% |
| ACUTA | 5 | 9.6% |
| IEEE | 3 | 5.8% |
| SNOWMASS | 3 | 5.8% |
| CUMREC | 3 | 5.8% |
| Total Respondents | 52 | |

30. List the four most important functions of your position.

| Functions | Respondents | Percent (of 52) |
|---|---|---|
| Leadership | 42 | 80.8% |
| Planning | 37 | 71.2% |
| Communication/Liaison | 32 | 61.5% |
| Provide Vision | 18 | 34.6% |
| Manage IS Budget | 18 | 34.6% |
| Coordination | 12 | 23.1% |
| Technical Expertise | 8 | 15.4% |
| Consensus Building | 7 | 13.5% |
| Problem Solving | 4 | 7.7% |
| All Other Functions | 3 | 5.8% |
| Total Respondents | 52 | |

31. List the top four strengths your institution brings to bear upon information resources management.

| Strengths | Respondents | Percent (of 54) |
|---|---|---|
| Institutional Commitment | 43 | 79.6% |
| IRM Organization | 22 | 40.7% |
| Technical Expertise | 18 | 33.3% |
| Talented Staff | 13 | 24.1% |
| Funding | 12 | 22.2% |
| Planning | 11 | 20.4% |
| Academic Programs | 9 | 16.7% |
| Innovation | 5 | 9.3% |
| Vendor Relations | 5 | 9.3% |
| All Other Strengths | 24 | 44.4% |
| **Total Respondents** | **54** | |

32. List the top four weaknesses which your institution must overcome in addressing information resources management.

| Weaknesses | Respondents | Percent (of 54) |
|---|---|---|
| Funding | 38 | 70.4% |
| Lack of Understanding | 29 | 53.7% |
| Organization | 20 | 37.0% |
| Lack of Human Resources | 16 | 29.6% |
| Bureaucracy | 14 | 25.9% |
| Lack of Planning | 9 | 16.7% |
| Technical Needs | 7 | 13.0% |
| Training | 7 | 13.0% |
| Lack of Coordination | 6 | 11.1% |
| All Other Weaknesses | 13 | 24.1% |
| **Total Respondents** | **54** | |

33. List the top four information technology trends impacting your institution.

| Trends | Respondents | Percent (of 52) |
|---|---|---|
| Networking | 33 | 63.5% |
| Increased Workstation Computing | 29 | 55.8% |
| Increased Access to Databases | 18 | 34.6% |
| Distributed Computing | 17 | 32.7% |
| Voice/Data Communications | 16 | 30.8% |
| Imaging/New Video Applications | 12 | 23.1% |
| Increased Academic Computing | 7 | 13.5% |
| Rising Expectations | 6 | 11.5% |
| Increasing and New Costs | 5 | 9.6% |
| Increased Human Resource Needs | 3 | 5.8% |
| Technological Obsolescence | 3 | 5.8% |
| **Total Respondents** | **52** | |

34. Have you published professional articles, books, etc. in the past five years?

| | | |
|---|---|---|
| Yes | 42 | (72.4%) |
| No | 15 | (25.9%) |
| Did not respond | 1 | (1.7%) |

If yes, please specify the number in the past two years. (Percents based on 42 who replied yes.)

| Articles | Respondents | Percent (of 42) |
|---|---|---|
| 0 | 5 | 11.9% |
| 1 | 8 | 19.0% |
| 2 | 9 | 14.3% |
| 3 | 3 | 7.1% |
| 4 | 4 | 9.5% |
| 5 | 4 | 9.5% |
| 6 | 1 | 2.4% |
| 8 | 2 | 4.8% |
| 15 | 1 | 2.4% |
| 16 | 1 | 2.4% |
| 17 | 1 | 2.4% |
| 25 | 1 | 2.4% |
| Blank | 2 | 4.8% |

(Two of the 42 who indicated they had published in the past five years did not indicate number of publications.)

35. Do you consult regularly?

| | | |
|---|---|---|
| Yes | 30 | (51.7%) |
| No | 27 | (46.6%) |
| Did not respond | 1 | (1.7%) |

If yes, how many days per year? (Percents based on 30 who replied yes.)

| Days | Respondents | Percent |
|---|---|---|
| 1 | 1 | 3.3% |
| 3 | 1 | 3.3% |
| 4 | 2 | 6.7% |
| 5 | 5 | 16.7% |
| 7 | 1 | 3.3% |
| 8 | 6 | 20.0% |
| 10 | 3 | 10.0% |
| 12 | 5 | 16.7% |
| 15 | 2 | 6.7% |
| 20 | 1 | 3.3% |
| Blank | 3 | 10.0% |

(Three of the 30 who indicated they consult regularly did not indicate how many days per year they consulted.)

36. Rank the following statements, with 1 being the highest, as to how accurately you feel they describe the role that senior administration at your institution expects you to fulfill.

Statements rank in the following order based on the rankings of 56 respondents:

1. provide leadership on technological issues
2. coordinate and integrate technology initiatives
3. develop a strategic planning process for information resources
4. formulate information technology policy
5. make the important technology decisions
6. "fix" information resource problems
7. relieve them from worrying about technological issues
8. authorize information technology purchases by user departments

37. Do you or your staff approve information technology purchases throughout the institution?

| | | |
|---|---|---|
| Yes | 41 | (70.7%) |
| No | 16 | (27.6%) |
| Did not respond | 1 | (1.7%) |

If yes, indicate exceptions (e.g., purchases under a certain dollar amount). (Percents based on 41 who replied yes.)

| Except | Respondents | Percent (of 41) |
|---|---|---|
| Those under $150,000 | 1 | 2.4% |
| Those under $100,000 | 1 | 2.4% |
| Those under $10,000 | 1 | 2.4% |
| Those under $1,000 | 3 | 7.3% |
| Those under $500 | 3 | 7.3% |
| Those under $250 | 1 | 2.4% |
| Those under $100 | 1 | 2.4% |
| Items on exempt list | 2 | 4.9% |
| No exceptions | 2 | 4.9% |
| Blank | 16 | 39.0% |

(Sixteen of those who said they approve purchases did not indicate whether or not there were exceptions.)

38. Circle the number representing your opinion on the following statements, with 1 being "Strongly disagree" and 5 being "Strongly agree."

*". . . in a world of accelerating decentralization, the most effective way to oversee a company's computer resources is to relinquish control of them and instead focus on the networks that connect them."*
Donovan, *Harvard Business Review* (Sep-Oct 1988)

| | | Respondents | Percent |
|---|---|---|---|
| Strongly Disagree | 1 | 1 | (1.7%) |
| | 2 | 17 | (29.3%) |
| | 3 | 7 | (12.1%) |
| | 4 | 25 | (43.1%) |
| Strongly Agree | 5 | 5 | (8.6%) |
| Did not respond | | 3 | (5.2%) |

*"CIOs' concerns seem [ed] to be moving beyond technology toward its effects on the people, processes, and products . . . ."*
Passino and Severance, *Planning Review* (Sep-Oct 1988)

| | | Respondents | Percent |
|---|---|---|---|
| Strongly Disagree | 1 | 1 | (1.7%) |
| | 2 | 4 | (6.9%) |
| | 3 | 10 | (17.2%) |
| | 4 | 25 | (43.1%) |
| Strongly Agree | 5 | 17 | (29.3%) |
| Did not respond | | 1 | (1.7%) |

39. Rank the following information management issues from most to least important, with the most important being ranked 1. (Source: *The Edutech Report*, September 1988)

The following ranking was derived from fifty-six respondents' rankings of these issues:

1. Resources (how to pay for growing demands)
2. Networking (funding, technology, etc.)
3. Integrating computing into the curriculum
4. Computer center staffing (salaries, skills)
5. Microcomputer support (for proliferation of configurations)
6. Organizational issues (merging academic and administrative computing; implications)
7. Desktop MIS for administrators
8. Buy or build software (administrative applications)
9. Faculty writing software (promotion and tenure, who gets income from sales, what resources to be used)
10. More responsibilities (telephone system, in-house publishing, computer retail store, etc.)
11. Studies of the effect of computerization, if any, on students

40. What do you feel will be the next step in your career?

**Replies from fifty-seven respondents included the following:**

A position in private industry
CEO small company
Chief Operations Officer
CIO at a larger institution
CIO at a more prestigious institution
CIO at an institution with more funds
CIO in the private sector
Consulting
Executive Vice President
I have no other aspirations, my job is already one of the best
Impossible to guess
More responsibility here, position redefined
No plans
Presidency of small college
President of a university
Provost
Retirement
Return to faculty
Same position at an institution with more money
Stay here
Vice Chancellor for Administration
Vice President for Administration
Vice President for IRM at a larger institution
VP Academic Affairs
VP at another institution

**Deloitte & Touche**

## Company Profile

Deloitte & Touche is a member of an international public accounting and consulting firm which operates three main divisions—Management Consulting, Auditing and Accounting, and Tax Consulting—providing a full range of services to clients. As one of the world's largest auditing and accounting firms, Deloitte & Touche has 516 offices in 89 countries of the world. In the United States, they are represented by 3,000 partners in 85 offices, with a professional staff of over 20,000. Having been established in 1947, Deloitte & Touche is one of the members of the Big Six and is considered a leader in its innovative and creative thinking.

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Deloitte & Touche is a leader in the field of higher education. In the past several years, the company has achieved excellence in this industry by developing in-depth knowledge in this specialization. Deloitte & Touche's consulting function assists clients in higher education in dealing with financial, operational, and information technology issues daily. In the information technology area, it has a group of dedicated professionals who focus on issues related to the successful use and application of information technology to solve critical systems problems.

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Deloitte & Touche offers a vast range of services to higher education. Along with auditing, accounting, and tax consulting, its management consulting professionals offer:

- Administrative systems requirements development, package search, custom development, and implementation
- Financial structures and systems
- Information systems operations review
- Strategic information systems planning
- Technology and capacity planning
- Telecommunications planning

As experts in these areas, Deloitte & Touche uses the skill sets from all functions to offer clients a full complement of expertise.

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Deloitte & Touche is very proud of the accomplishments they have achieved with their clients. The following examples show how Deloitte & Touche's clients have received value-added insight.

▲ *Administrative Systems*—Deloitte & Touche has worked with many colleges and universities to replace their student information, financial management, payroll/personnel, and alumni development systems with a combination of software packages and custom programming designed to meet the information needs of the institution.

▲ *Financial Structures and Systems*—Working with a large university, Deloitte & Touche was able to identify new financial management controls, information systems, and related management reports to control financial expenditures. This program resulted in significant savings to the university.

▲ *Information Systems Reviews*—Deloitte & Touche was engaged to analyze the performance of a major state university data processing department. The study included the review of department expenditures, technology usage, applications portfolio, skills assessment, and EDP controls. The results included a reorganization of the department and overall reduction in development expenditures through the acquisition of software tools designed to increase development productivity and quality.

Deloitte & Touche has organized experts in several information technology disciplines dedicated to remaining abreast of the key issues, products, and processes within the information technology industry. An example of this focus is the company's approach to strategic information systems planning that has been based on many years of practicing in this area. The following chart depicts Deloitte & Touche's strategic information systems planning methodology that has been utilized in higher education as well as other industry engagements.

*Deloitte & Touche joined CAUSE in 1988, and has participated in the last two CAUSE national conferences through exhibits, suite hospitality, and presentations, and funded the publication of CAUSE Professional Paper #4,* The Chief Information Officer in Higher Education.

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## Strategic Information Systems Planning Approach

### Assessment

**Information Systems Strategy Review**

**QUESTIONS**
- Where are we?
- Where is our competition heading?
- Where do we want to go?
- What are the issues?

**CONSIDERATIONS**
- Business Direction/Needs
- Internal Capability/Position
- Industry/Competitive Trends
- Technology Trends

**ACTIVITIES**
- Review Business Direction/Needs
- Determine User Needs/Satisfaction
- Review MIS Plans, Organization and Management
- Assess Competitive IS Direction
- Review Technology Trends
- Define Key IS Strategy Issues

**END PRODUCTS**
- Application Profile
- Technology Profile
- Competitive Position Assessment
- IS Strategic Planning Issues

### Strategy Development

**Information Systems Strategy Direction**

**QUESTIONS**
- What are our options?
- What are the costs/benefits and trade-offs?
- What is the "best" direction?

**CONSIDERATIONS**
- Business Objectives/Goals
- Information Needs
- Broad Alternatives
  - —Applications
  - —Data Management
  - —Technical
  - —Organization
- Business Impacts/Risks

**ACTIVITIES**
- Develop Preliminary Objectives, Goals, Strategies and Broad Priorities
- Define Potential Business/Functional IS Needs (Business Model) Management Model
- Develop Information/Data Management Model (Data Architecture)
- Develop Organization Strategy/Plan (Organization Architecture)
- Select IS Strategic Direction

**END PRODUCTS**
- IS Objectives, Goals and Strategies
- Information Plan
- Application Portfolio
- Technology Architecture
- IS Organization Strategy
- Preliminary Costs/Benefits

### Plan Development

**Information Systems Master Plan**

**QUESTIONS**
- What are the priorities?
- What resources are required?
- When will it be done?
- How do we manage it?

**CONSIDERATIONS**
- Organizational Capabilities
- Resource Constraints
- Financial Implications
- Measure of Success
- Responsibilities
- Risks

**ACTIVITIES**
- Develop Specific Plan Priorities/ Sequence
- Develop Financial Plan
- Develop Implementation Plan/ Assign Responsibilities
- Identify Major Milestones
- Develop Control Reporting Process
- Establish Management Monitoring/ Control and Update Responsibilities
- Obtain Organizational Commitment

**END PRODUCTS**
- Master Plan Priority Assumptions
- Detailed Implementation Plan
- Success/Performance Measures
- Financial Budget/Plan
- Plan Monitoring/Control Process

# Professional Paper Series

**#1** ***A Single System Image: An Information Systems Strategy***
*by Robert C. Heterick, Jr.*

A discussion of the strategic planning for information systems, incorporating a description of the components needed to purvey an institution's information resources as though they were delivered from a single, integrated system. The "single system image," the vehicle through which tactical questions are resolved, comprises electronic mail, data base access, print and plot service, and archival storage for all users. Funded by Digital Equipment Corporation. 22 pages. 1988. *$8 members, $16 non-members.*

**#2** ***Information Technology—Can It All Fit?***
*Proceedings of the Current Issues Forum at the 1988 CAUSE National Conference*

Based on the proceedings of the Current Issues Forum at the 1988 CAUSE National Conference in Nashville, Tennessee, where three panelists discussed information technology management on campus. Paige Mulhollan, Wright State University President, advocated a highly centralized management style, i.e., forming an Information Resources Management (IRM) organization. Robert Scott, Vice President for Finance at Harvard University, discussed factors that affect an institution's decision of how to organize and how these factors have led to a decentralized approach at Harvard. Thomas W. West, Assistant Vice Chancellor for Computing and Communications Resources at The California State University System, explored alternative models for managing information resources and offered advice for gaining IRM acceptance. Funded by IBM Corporation. 17 pages. 1989. *$8 members, $16 non-members.*

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**#4** ***The Chief Information Officer in Higher Education***
*by James I. Penrod, Michael G. Dolence, and Judith V. Douglas*

An overview of the chief information officer concept in higher education, including the results of a survey conducted by the authors in 1989. This paper examines the literature that has developed as increasing numbers of organizations in business, health care, and higher education have embraced the concept of managing information as a resource and addressed the need for a senior-level policy officer with responsibility for information technology throughout the enterprise. The authors provide an extensive literature review, including a discussion of industry surveys, as well as a bibliography of nearly 150 books and articles. Their CIO survey results are included in the appendix. Funded by Deloitte & Touche. 42 pages. 1990. *$8 members, $16 non-members.*

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